

The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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English Foundry Practice.

Several months ago we illustrated and described what is known as Stewart's rapid cupola, invented by Mr. Stewart, and manufactured by Messrs. Thwaites Bros., of the Vulcan Iron Works, Bradford, England. At that time the cupola was noticed in connection with a fixed receiver. The accompanying engravings, for which we are indebted to Messrs. Thwaites Bros., refer to a system of portable receivers, and convey a very good idea of the foundry arrangement adopted by them.

With regard to the cupola itself, it will be remembered that its salient feature is that it contains three zones of fusion surrounded by as many rows of tuyeres, termed respectively lower, middle and upper zones. In the top row each tuyere is provided with a shut-off valve. These valves have their plugs connected together by pitch chains, and are operated simultaneously by one handle. The rows of tuyeres are all inclosed in a circular belt, and opposite each tuyere is a cover provided with a colored mica disk. The cupola is arched over at the top, and has an opening fitted with a damper door for the escape of the gases. It stands upon a cast-iron plate on four short columns, as seen in Fig. 1 of the engravings. This figure shows the "Rapid" cupola applied to a foundry and driven by a Root's blower and direct-acting duplex engine. Two cupolas are shown, one being fitted with a fixed receiver and the other being worked with portable receivers, which are seen at various points in the foundry. These receivers are shown in side elevation, end view and longitudinal section respectively, at Figs. 2, 3 and 4 of the engravings. A narrow-gauge line of rails, 15 inches wide, is used for rapidly and conveniently conveying the molten metal from the cupola to any required mold by means of the portable receivers. Each receiver consists of a wrought-iron casing, fire-brick lined and mounted on an angle-iron frame supported and carried on flanged wheels of the same gauge as the portable rails laid round the foundry. To one axle of the carriage is fixed a worm-wheel, actuated by a worm and hand-wheel, to permit of the easy transit of the receiver by hand, and to prevent its movement while the metal is being discharged. The receiver is fitted with a spout for tapping, and with two plugged holes, one on each side of the arched cover, for charging and for the escape of gases. The advantage of these portable receivers is that any number of them can be used in running large castings without interfering with the ordinary work of the overhead traveling crane, and thus completing the usefulness of Mr. Stewart's system, which has been supplied by Messrs. Thwaites to several firms.

Artistic Glassmaking.

The artist who can furnish designs to the Pittsburgh manufacturers of table glass, says the Pittsburgh Times, and guarantee their "taking" qualities, could retire in a few years with an independent fortune, buy a mansion on Fifth avenue and spend the rest of his days in glorious ease. These gentry are perpetually on the lookout for something new. They are always experimenting, always throwing out a bait and eagerly waiting for the public to bite. When they walk down Fifth avenue on the way home from church, it is not the preacher's arguments against Ingoldsby they are thinking about. They are keeping an eye on the windows of the jewelry and china houses to see if they cannot discover something in the way of a pitcher, a goblet, a decanter or a tray that it would be worth while to copy in glass. If their eye strikes the proper article, over comes an artist on the following day, over goes the design on paper, and a week later the mold-maker is laboriously chipping it out in a circular piece of chilled iron. If it is an ordinary set of from 25 to 30 pieces, the molds will cost about \$3000, though if the set is complete it may cost as high as \$16,000, that amount having been paid by a South Side firm for 65 pieces. The goods are thrown upon the market. They may have a tremendous run and bring thousands of dollars of profit; they may "fall flat" and make the entire outlay a total loss. There is scarcely a firm in the city whose lumber room does not contain thousands of dollars in molds that never paid the cost of their making. As a general thing the manufacturers make their own designs.

Said a member of a leading firm recently: "One or two employ artists, but not one out of 50 is of any practical use. They make design after design that is of no use what-

ever. They do not understand our work at all. We have to do the best we can and take our chances."

"Aren't there foreign artists who can do the work?"

"No, the designs that they make do not suit our people. They design articles with reference to a particular class of people, and they have the whole world, you may say, in which to sell that class of goods. With us it is different. We must make our designs with reference to the needs of all classes of people. We must make something that everybody will buy. It wouldn't pay to get their designs for a high class of goods; the demand in this country isn't great enough for them. A single factory in Pittsburgh would make enough for the entire country."

"How long does a design usually last?"

"The life of an ordinary design in glass is about two years, but many of them do not last longer than six months. Some of the most expensive and elaborate are dropped the quickest, and often a little inexpensive thing turns out a regular mint. For instance, a South Side firm once took the

of alligator skin. Imitations of cut glass and craved ware, which have had a big run for the past two years, are still much called for, though some manufacturers predict that their day will soon be over. Plain ware engraved is in steady demand. Victor Huie, a French mold-maker at Beck's works, has recently obtained a patent for an imitation diamond ware that is smooth on both sides, and thus avoids the housewife's objection of gathering dirt. It will be put on the market by Duncan, and it remains to be seen how the public will take to it."

The British Tariff.

As a matter of present interest we reproduce the following article from the St. Louis Democrat, which they publish in reply to a correspondent's request for information as to whether England is "an example of absolute free trade:"

This question is frequently raised, in Congress as well as out. The answer depends on the meaning attached to the words of the inquiry; and, in passing, it should be

beer range according to strength from \$2 to \$6 a barrel of 36 gallons; and on spirits from \$2.54 to \$2.60 per proof gallon. Other rates are \$4.12 $\frac{1}{2}$ a gallon on perfumed spirits and cologne water, 75 cents a pound on chloroform, \$6 a gallon on collodion, \$0.25 a gallon on sulphuric ether, \$3 a gallon on varnish containing alcohol, \$4.25 an ounce on gold plate, 37 $\frac{1}{2}$ cents an ounce on silver plate and 90 cents a dozen packs on playing cards, all these duties being counterbalanced by excise duties or stamps on corresponding British-made commodities.

Among the ordinary import duties are the following, comparisons being made with the rates in this country:

	Great Britain.	United States.
Cacao, b.	2d	Free.
Cocoa, husks and shells.	1d	Free.
Cocoa, manufactured.	4d	2d
Coffee, raw, b.	3d	Free.
Coffee, roasted or ground.	4d	2d
Chicory, raw, b.	3d	2d
Chicory prepared.	4d	2d
Dried fruit, b.	1d	1 to 2d
Tea, b.	1d	Free.

Our rates on wines range from 50 cents to

establishment in New York desired to enlarge its facilities, and a new building was necessary. In excavating the area under the pavement it chanced that the workmen came in contact with a pole that had been set up by a local telephone and telegraph company, and they proceeded to remove it, but the company obtained an injunction and stopped the work of excavation, coolly claiming that to remove the pole would be infringing upon vested rights of the concern. This refreshing assumption has been overthrown and the injunction dissolved after several weeks of delay.

Forts of Chilled Iron.

The important part which iron is destined to play in the construction of coast defenses is well described by an army officer in a recent interview. He remarked:

The matter of defense is no longer a question of possibility; it is a question of the pocketbook. By a sufficient expenditure of money a fort can be built that projectiles from the heaviest guns ever cast will have no effect upon. Chilled iron, wrought iron and steel are now regarded as the best materials for forts. Of these, chilled iron is probably the best. Austria, Germany and Belgium use chilled iron for coast defense. England uses wrought iron. A good fort is made by putting a plating of steel over wrought iron. Chilled iron has never been penetrated. If the shield or plate fired at is not thick enough it may be shattered, but never penetrated. Wrought iron may be penetrated, but if the shot does not go clear through it is just as good as before. When three or four shots have penetrated a plate of wrought iron its usefulness is gone, but it is considered to have performed all the service it was intended for and its money's worth has been got out of it. The days of earth works and masonry fortifications have gone by entirely. They are only of use in these days of heavy ordnance as a protection for gunners against small shot, bombs and flying pieces of exploded shells. Masonry can be knocked out of time by shots from heavy ordnance very readily, and, as to earthworks, the best constructed earthen defenses have been penetrated for a distance of 50 feet.

There is no limit to the thickness of iron forts except the length of the guns. Iron turrets are being introduced for forts and are exceedingly effective. In England and on the Continent there are a number of them. They revolve just as do the turrets of monitors and turret ships.

All the principles of the iron revolving turret as now used were incorporated in the designs exhibited here by Trimby in 1845. I have seen the fortifications of all the European powers, and England beyond a doubt has the finest and most complete system of coast defenses in the world. As to the cost of iron forts, it costs about \$19,000 a gun for works composed partly of iron and partly of masonry. In such works an iron shield is used to protect the guns and the gunners. This iron shield is between piers of masonry. A good all-iron fort can be built for \$56,000 a gun. Turrets cost from \$200,000 to \$300,000 a gun. England has several excellent turret forts, notably the one on the

end of Portland Pier. The approaches to Antwerp are defended by four large turrets. Germany has several on the coast. France has a line of turrets on her German frontier, and Austria has the harbor of Pola strongly defended by turrets. The most approved method of working the turrets now is by steam—hydraulic power. That is, steam is used to work the hydraulic engines which turn the turret. Against a chilled-iron fort or properly constructed turret the guns of Her Majesty's ship *Inflexible* might pound in vain.

Armor Plates to be Made in Italy.—A Rome letter to the Liverpool Post says that the Venetian Industrial Company, who have a large iron foundry at Terni, will shortly commence the manufacture of the armor plates for the Italian Navy, which have hitherto been supplied by English firms. It has not yet been decided what system shall be adopted, and nothing will probably be done until after the conclusion of experiments now being conducted at Spezia, with the view of testing the relative merits of plates made of pure hammered steel and of iron and steel combined. In future, also, preference will be given as far as possible to native industry in the manufacture of boilers and engines for Italian men-of-war, the Naval Department being much dissatisfied with the material lately supplied by English contractors.

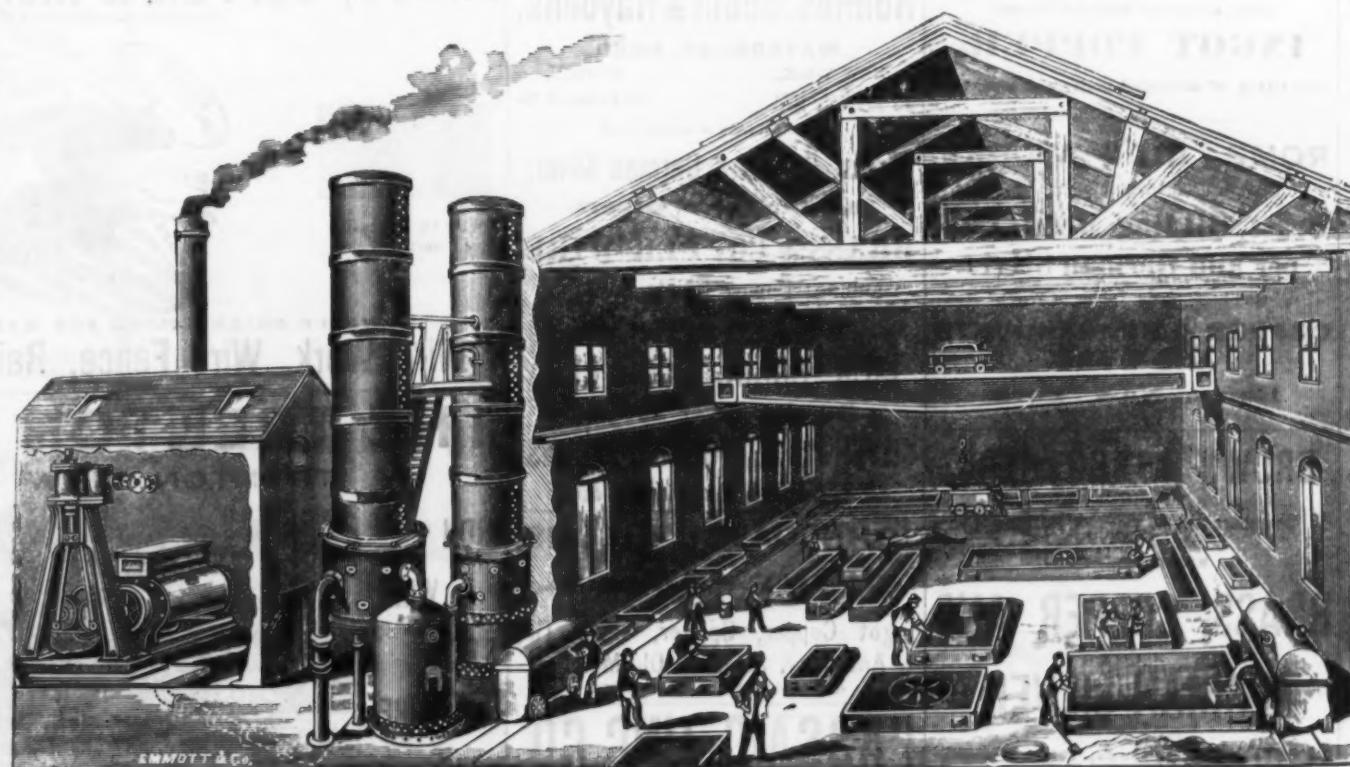


Fig. 1.—General View of Foundry Arrangement.

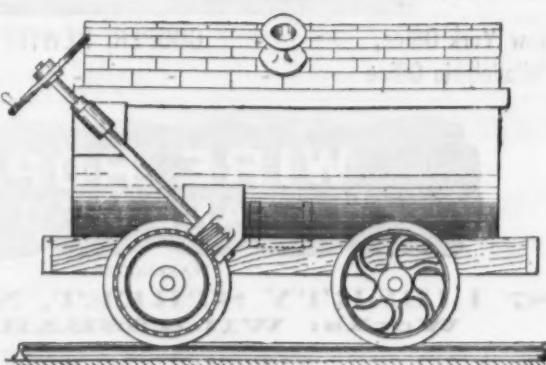


Fig. 2.—Elevation of Receiver.

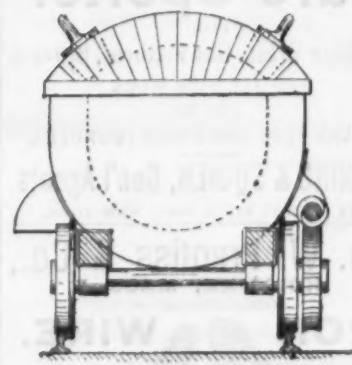


Fig. 3.—End View.

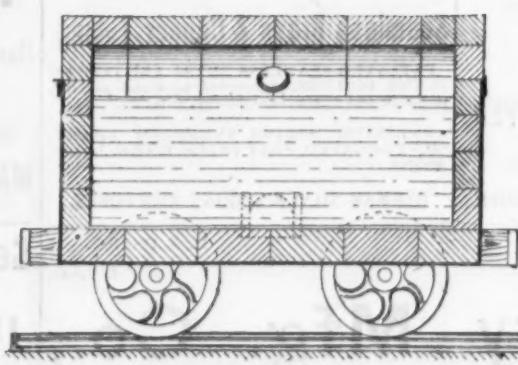


Fig. 4.—Longitudinal Section.

ENGLISH FOUNDRY PRACTICE.

design of a fish pickle dish in a china store. They changed it a little, patented it, and it had an enormous sale."

It is said that on an average the large tableware firms pay about \$10,000 a year for the item of molds and patterns. The material costs but little, the designing less, and almost the entire expense is in the labor. The work is done by about 200 mold-makers. Many of them are French and Germans, but the greater part are Americans who have been put through special training for their work. Good ordinary workmen make from \$18 to \$24 a week and the best receive about \$45. There are but two establishments in this part of the country employed exclusively in mold-making—both on the South Side. Most of the large glass firms have mold shops of their own, and do part or all of their own work. Adams & Co. and George Duncan & Sons, on the South Side, each employ about 18 mold-makers; Bryce Bros. and the O'Hara Glass Company, Limited, each employ about 15; King, Son & Co., Campbell, Jones & Co., and Ripley & Co. each about 12; Richards & Hartley about 10; Atterbury & Co. and Doyle & Co. about four each.

This year a number of novelties are being introduced. One of them is bronzed ware. The glass is given a coat of silver or gold on the under side, which is covered with a bronze. This is done in various colors and combinations, and is pretty. Another is the polka dot, and still another an imitation

said that a great deal of breath is wasted on both sides of the tariff issue, through lack of agreement among disputants upon the significance of the terms which they use. "Absolute free trade" is the phrase commonly employed to designate entire exemption from duties on imports. In this sense England does not enjoy absolute free trade, for numerous imports are taxed, "Free trade," again, is often held to be synonymous with "a tariff for revenue only." Attaching this meaning to the words, it is to be observed that with possibly three or four slight qualifications England is a free-trade country—a country, that is to say, in which duties are not laid to protect domestic industries.

The total number of articles and subdivisions of articles in the English tariff is about 50, as against 521 ratings in our own. The principal sources of customs revenue are tea, coffee, sugar, cocoa, wine, spirits, malt liquors and tobacco. But spirits, ale and beer, and some other articles on which import duties are laid, are also produced in England. If these were not subject to internal taxation, the duties on the imported merchandise would be at least incidentally protective. Accordingly, an excise tax is imposed on the domestic production to counteract the import duty, or the duty is laid to counteract the excise, whichever way one is pleased to look at it. The result, at all events, is to equalize the taxation. The duties on imported

\$2.25 per gallon. The English rates are 25 cents a gallon on wines containing less than 26° of proof spirits, 60 cents a gallon if containing 26° to 42° of spirits, and 6 cents additional per gallon for every degree of strength beyond the highest above specified. These rates, it will be observed, are imposed on commodities not produced in Great Britain.

It is evident, however, that there is a discrimination in favor of English manufacturers or preparers of cocoa, coffee and chicory, and this amounts to protection for them as against foreign houses in the same business. The same protection is extended to manufacturers of tobacco, for, while the duty on unmanufactured tobacco is either 8d or 9d cents a pound, the charge on manufactured chewing or smoking tobacco is \$1.04 to \$1.16, on snuff 98 cents to \$1.16, and on cigars \$1.32 a pound. To this very limited extent the British tariff is protective. It is possible, moreover, that these rates on manufactured cocoa, coffee, chicory and tobacco are at the "revenue point"—that is to say, that they are so pitched as to produce the maximum income for the Treasury. If this is the case, they do not violate the principle of a purely revenue tariff, though incidentally protective.

A peculiar conflict over the rights of property owners was recently adjudicated in one of the courts of this State. A manufacturing

* See *The Iron Age*, May 1, 1884.

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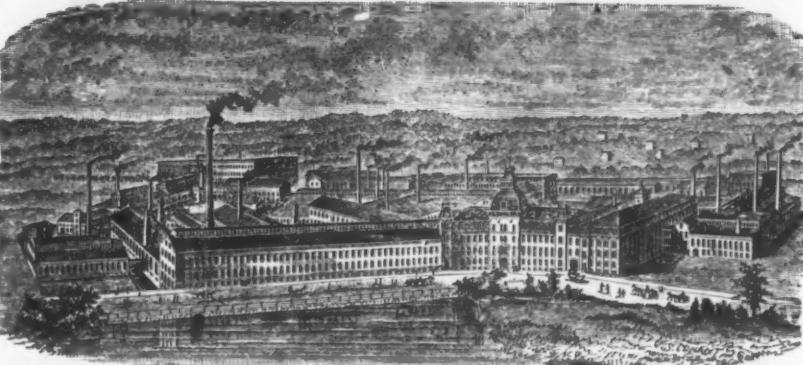
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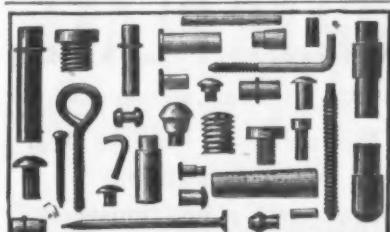
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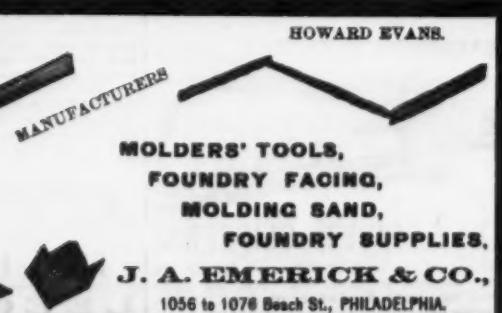
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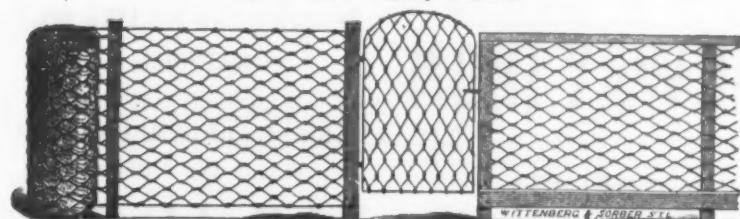
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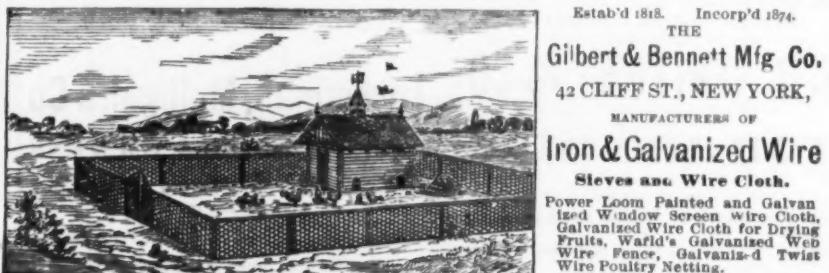
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The Seraing Steel Works.

The following description of the works and mines of the Société Cockerill, Seraing, Belgium, is from the report, recently completed, of the Royal Commissioners on Technical Education:

The commissioners visited the works of the Société Cockerill, at Seraing, near Liège, and were most courteously received and conducted over the various departments by M. Greiner, director of the steel department. As is well known, the works were founded by John Cockerill, a Lancashire man, in 1817. It is said that in the beginning of his career, Cockerill—who, besides possessing indomitable energy and perseverance, was a thoroughly skilled workman—assisted by his son, did all the forging, turning and fitting of the little shop, the son often having to turn by hand the lathe or drill at which the father worked. At that time the population of Seraing was under 2000; it is now 50,000, including the adjacent villages. As Cockerill prospered he purchased the old palace of the Prince-Bishops of Liège, which he transformed into a work-shop, eventually roofing over one of the courtyards, which now does duty as an erecting shop. The offices for the clerks and draftsmen are situated in the original palace, the office of the director forming a part of a large quadrangle, which is ornamented in the center by an imposing fountain with four bronze figures of brawny artisans. We were informed that the works, including some of the mines, now cover over 250 acres and give employment to from 9000 to 10,000 men, to whom £400,000 a year is paid in wages. The company possess 280 stationary engines, with motive power equal to 12,000 horses, and they consume 1000 tons of coal and coke per day. In addition to steel rails, which they export to all parts of the world, boiler-plates, and other kinds of steel and wrought iron, they are able to produce each year 100 locomotives, 70 stationary and marine engines, 10,000 tons of iron bridges, girders, boilers, &c., and 14 iron ships, besides general machinery, steel guns, hydraulic cranes and many other kinds of iron-work. Excepting, perhaps, the foundry of La Creuzot, in France, these works are unrivaled throughout the world for the variety of their productions.

For the purpose of making our tour of the works we were conducted to a handsome tram-car drawn by a steam engine, which started at the reception room of the offices. We skirted the machine works, ascending by an incline a huge mound of furnace scoria. On approaching the top we alighted at the collieries, about half a mile from the offices. The coal shafts are about 2000 feet deep, the cages being worked by powerful and handsome engines, the whole enclosed by buildings of a permanent and substantial character. In these respects the pits' mouths and banks presented a striking contrast to those of England, where the gearing and ropes in their passage from the engine to the pit-head are usually in the open air. The ventilation, as usual in Belgium, is by exhausting fans; and we noted a large barometer in close proximity to the indicating-clock, which latter shows the speed of the ventilating engine. The barometer is constantly under the eye of the engineer in charge, and whenever it is depressed the speed of the ventilating fan is immediately increased, so that the increased development of explosive gas, due to diminished atmospheric pressure, may be as far as possible balanced by increased ventilation. Generally these mines have been free from accidents of a serious character, but two years ago there was a terrible explosion, when 62 men were killed. The coal from one of the shafts was landed and delivered to coke ovens on the same level as the tops of the blast furnaces adjoining, which they supply, thus avoiding, as far as this portion of the coke is concerned, any hand labor except for moving the trucks on the level. The coke ovens were of the Coppée pattern, producing about 75 per cent. of coke from the coal.

The labor of dragging and pushing the coal trucks along the viaduct from the top of the shaft to the top of the furnace was performed by women, who seemed robust and healthy. We were informed that the Seraing Company do not employ women underground, and that the rough and exhausting work in which we saw them engaged is voluntarily selected by them. To deprive them of it would deprive many strong and able-bodied women of a livelihood and tend to raise the cost of production by limiting the supply of laborers. In the Charleroi district little girls go into the pits and take their share of the rough work with the boys. Many of them continue in employment at collieries through life, but female labor is becoming less and less common. Although there is no law against the employment of females underground, the public sentiment of the country has risen against it in the Liège basin. They are, however, commonly employed on the banks, screening, dressing, washing and moving the coal.

There is an evening school for miners connected with the works, which is attended by about 130 boys, all of whom, in addition to elementary subjects, are taught the elementary principles of mining and the nature of the gases which so constantly imperil the lives of the pitmen. Three large firms have started similar schools, and so convinced are the rest of the colliery proprietors of their importance that schools of the same character are being established in all the coal districts.

The wages of miners are paid by the ton, and they earn on an average about 3/ per day; banksmen earn about 2/6 per day; women on the banks at tramwork, &c., earn about 1/8 per day. The miners and the men and women on the banks work in two shifts of 8 hours a day each. Near the mines are almshouses and an orphanage for widows and children of miners who have been killed or disabled at their work. The institutions are maintained by the subscriptions of the miners, and by large subsidies from the company.

From the pit-head we were taken in the steam tram-car up a further incline to the summit of the huge mound of scoria, where we found ourselves on a level with the tops of a set of four new blast furnaces. The ore which was being smelted is imported from Bilbao, in Spain. The trucks from the rail-

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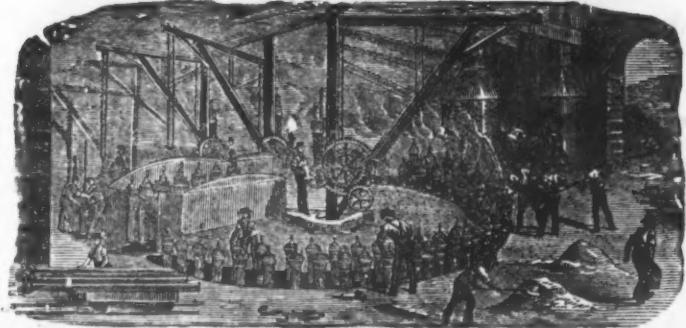
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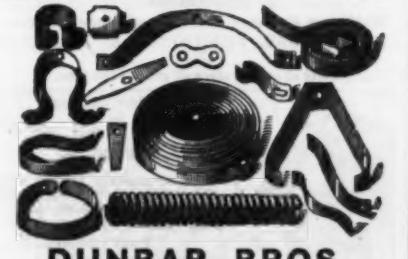
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FIG. 120.



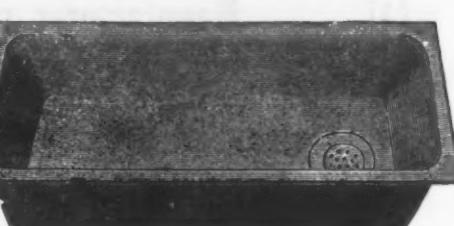
FIG. 129.



FIG. 70.



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way, without being unloaded, are brought by locomotives to the top of the mound, where the contents are ready for being discharged with the greatest ease and economy of labor directly into the furnaces. We descended by an iron staircase to the foot of the latter, where some of the iron was being run into molds for pigs, and the remainder conveyed in a molten state to the Bessemer converters for steel-making. The spectroscope is employed with great advantage in indicating the precise moment when the conversion is so far completed that the metal is ready for the addition of the spiegel, thus dispensing with the ordinary practice of arresting the blowing while "proofs" are being taken. All the work in this department was being carried on with precision and order, and the arrangements of the casting pits were very practical and complete. The men work in gangs, and are paid by weight, according to scale, each in accordance with the importance and difficulty of his work. Heaters earn about 5/6; rollers, 6/ per day; blowers and pourers of the metal average about 4/; the laborers who assist and remove the ingots are paid about 2/6 per day. The activity of the groups of men clustered at this point may be inferred from the fact that they make and pass forward to the next department upward of 350 tons of steel per day. The foundry is very large, well lighted and ventilated. A remarkable feature in the foundry was the excellence of the very large and complicated loan castings. In this department we were informed that the wages are from 4/6 to 5/ for the men, and from 9d. to 1/ per day for the boys.

The fitting and turning shop, and the engine-erecting shop, are of corresponding proportions to the other branches of the works. They are arranged with a view to economy and efficiency, and nothing seemed to be wanting in the way of tools and appliances for doing work on a large scale, and doing it well. Great cleanliness pervades the whole works. In the steel department alone they spend £120 a year on lessons. The mechanics, all of whom are paid by piece, earn as follows: Boiler-makers, about 3/3 per day; fitters, 2/9 to 3/; smiths, 2/3 to 3/6; laborers, 2/6.

The drawing office of an establishment turning out so much original, varied and complicated work is necessarily a department of importance. Upward of 100 draftsmen are employed, of whom the head is an Austrian, who received the theoretical training of an engineer in the Polytechnic School at Vienna. At least 25 of the draftsmen are Germans, Swiss and Austrians, who have gone through polytechnic or other technical schools. The rest are nearly all Belgians, some of whom have attended the University at Liège. One of the managers stated that when he was a boy the leading engineers in iron and machine works everywhere on the Continent were Englishmen. They were engaged at high salaries because of their practical knowledge of work and workshop requirements, and it had been a custom to select them from the works of rival English firms of eminence, so that they might learn the secrets of English skill and copy English methods. Since that time they have found that the English, though practical, are not scientific; they bring with them no advantages to compensate for the high salaries they require, and they are now seldom engaged. Although at one time several Englishmen held leading positions in these works, beginning with the founder, he was not aware that a single Englishman is at present employed in the entire works.

The company do not sell much of their produce in England, but elsewhere in all tenders for machinery, engines or raw iron and steel their chief competitor is England. In everything they make they take England as their guide and as their rival, and they are compelled to fix corresponding prices on all their products. They buy from England every tool that tends to cheapen production, and they watch the progress of English inventions and appliances as if England were situated across the river.

We were informed that, although all the departments of these vast works are connected with each other under one head, they are commercially distinct. The colliery manager sells his coal at the best price he can get for it. If the smelters and steam users of the establishment will not give as much for it as outsiders, he passes them over and sells to outsiders. In the same way, if these coal users can buy cheaper and better coal outside, they do so, and compel their coal manager to work "close to the nail." This method keeps all the departments up to the mark, and prevents them, in times of depression, from blaming each other for want of success. They all clearly understand, however, that the interests of the shareholders are best promoted by the harmonious working of all the departments, and this is secured by the supervision of the general director.

Boys are not admitted to the works under 14 years of age, and they are not bound for any period or for any definite employment or salary. There is no fixed age when a boy finishes his so-called apprenticeship and becomes a journeyman. When a boy comes to the works he is put to some simple occupation and paid by piece. The question of passing a boy forward is settled in accordance with the simple principles on which the works are conducted. They endeavor in everything to secure the best possible results by the most economical and efficient means. The dull boy is put to routine work and kept at it; the intelligent, quick boy is put to work that requires brain power and skill. In both cases their plan is mutually satisfactory.

Division of labor is universal. Many men learn to do one thing and no other. It would not be to their interest to take a boy or a man from a machine, or from some kind of work which he manages well, and put him to another kind of work which he would have to learn. Time and money would be lost during the process of learning, and neither master nor workman is prepared for the sacrifice. Almost universally a man prefers the work at which he can earn most money; call it a trade or only the tenth part of a trade, it is all the same to him, and any change of employment that would lower his wages would certainly cause him to com-

plain. Thus the apprenticeship system of former days no longer exists, and the division of labor, whatever may be its effect upon the general capacity of individual men, is pushed to quite as great an extreme here as in the large workshops in England.

On the question of the scientific and technical instruction of young men there were no two opinions among all those with whom we conversed. The managers of all the departments consider that, next to the best possible tools and appliances for their work, the most important factor is the technical knowledge of their men. In order to promote this knowledge they take great interest in the schools. Attendance at night schools is not compulsory, and they complained that many youths were apathetic and lacking in desire for improvement, but there was an undoubted superiority on the part of those who applied themselves to theoretical studies. When asked whether the naturally intelligent and studious youths would not surpass the dullards, even without attendance at night schools, the reply was that night schools were especially useful in developing and cultivating the natural faculties of the more intelligent young men. It was argued that dull apprentices were improved by education, but that intelligent apprentices were doubly improved by it, and that, therefore, looking at the question from the point of view of the employers, it was more important to educate the quick boys than the dull ones. We have already alluded to the school for miners, attended by 130 boys. There is also an industrial school, in which there are 100 students in the preparatory section and 270 in the industrial school proper. In addition to the technical and special schools, there are adult night schools connected with the works and the town of Seraing, which are attended by from 1800 to 2000 students, varying from boys to middle-aged men. Whatever disappointment there may be that the educational provision is not taken advantage of as it ought to be, these numbers indicate a considerable desire for instruction among the men, and reflect credit on the heads of the departments who encourage the young men under them to attend the night schools. M. Greiner strongly urges all young men in his department (steel) to attend such evening classes as are suited to their abilities and requirements. A monthly list of attendance is submitted to him, and in case of absence he demands to know the reason why. In instances of willful neglect of instruction and repeated absence without cause he has dismissed young men from his employment altogether. Happily, in requiring the attendance of apprentices, he has the co-operation of parents. The night schools are free. It was stated that in pushing education indiscriminately among young men there is a danger to be guarded against. Many who find that they know a little more than their companions become conceited and spoiled. They have an impression that because they know something of mathematics and algebra, and can draw a machine, they therefore ought to have their wages advanced, or be promoted to foremen. This feeling becomes less prevalent year by year, because the higher attainments among the young men are becoming more common. Time and experience correct the ambitious fancies of many of these young men, and the young fellows who get promotion, or take higher situations elsewhere, are those who excel in the class-rooms as well as in the workshop.

There are several societies established by the employers for the purpose of promoting good-fellowship and amusement. Among these are musical societies with brass bands, and orchestral bands of stringed and reed instruments. The workmen join in these entertainments. They have every winter weekly lectures in the largest room in the town, given by the heads of departments in the works, by scientific and literary men from the University of Liège, and by popular lecturers from different parts of Belgium. M. Greiner was advertised to give a lecture in the following week on the "Industrial Applications of Electricity," and he felt confident that he would have a large and appreciative audience, composed chiefly of workmen. Twenty-four lectures were to be given during the winter (1882-83). Musical and literary entertainments, analogous to the penny readings so popular in some parts of England at one time, have also been introduced. The music and readings are supplied by the workmen, and the meetings are often presided over by the departmental directors, or by leading residents unconnected with the works. There are also gymnastic clubs, and athletic competitions are periodically held.

There are no trades unions, and we did not hear of any organized methods for the settlement of disputes. Since 1838 there has been a sick club, to which all the workmen contribute. Until about 10 years ago the club was managed by the company in the interest of the men, but the system was abused, for workmen frequently claimed the benefits of the society on pretenses whose groundlessness could not always be disproved. A committee of workmen now manages the society, and investigates all applications for relief. Connected with the works are large and important co-operative stores, managed by the members of the society, in the same way as in England. Food, clothing, fuel and other necessities of life are sold at as near the cost price as possible, and the stores are largely patronized.

There was general unanimity among the gentlemen from whom we inquired as to the sobriety of the workmen. Not one of them had any serious fault to find with the men on the score of drunkenness; in fact, it is so rare as almost to be unknown as a cause of time being lost. When asked if many men absented themselves through drink, after a holiday, the manager of one of the largest departments answered by an emphatic "No." We were informed that many of the workmen reside 10 or 15 miles from the works, and come for the week, bringing their food with them. This consists of two large loaves, a piece of bacon, or sausages and eggs; they buy potatoes, onions, &c. They get lodgings for 2d. a night. This kind of life is quite common; small things satisfy these country people, and they save every possible farthing of their earnings.



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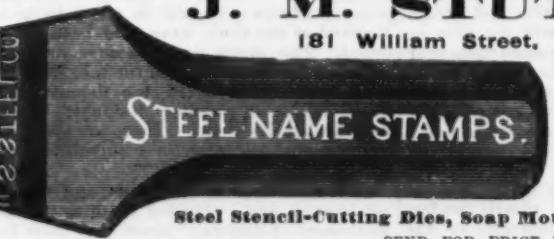
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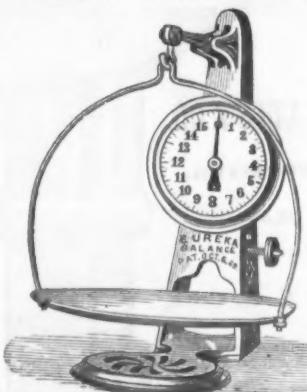
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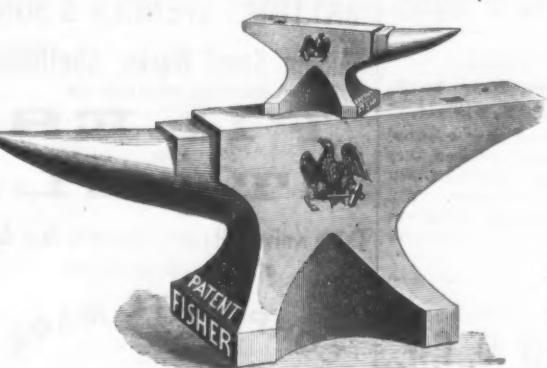
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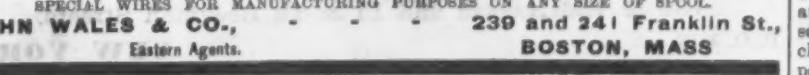
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Their families in the meantime cultivate their little plots of land at home, which in many instances have been owned by the same families for generations. The workmen from the country, with simple tastes and habits of thrift, are considered more trustworthy than natives of the town, some of whom are apt to go off by the tram cars to Liège, at night, to amuse themselves.

unjustly converted this coal to their own use, and surely they cannot make a charge for labor in making this conversion. The coal should not have been removed from the cars under the untenable claim for freight."

Co-operation in England.

It will probably surprise most people, says the New York Tribune, to be told that in England co-operation has made such headway as to induce a cautious journal like the Spectator to predict "that long before the century is out the whole of our working class will be in association, and will have the staple trades of the country in their hands or under their control." Yet the statistics of the movements seem to show that such a prediction is not idle exaggeration. At present there are over 1200 societies of working-folks, numbering 600,000 members. Almost all of them are heads of families, and they therefore represent 2,500,000 people, or one-twelfth of the whole population of the Kingdom. These societies possess a capital of \$45,000,000, and make a net profit of \$10,000,000 yearly. Besides this they have a Wholesale Society, now in its 20th year, which, on a capital of \$200,000, does a business of upward of \$15,000,000, with a net profit of \$160,000. This concern has branches and depots in Scotland, Ireland, this city, France and Denmark, and owns three large steamers which play between England and the Continent on the company's business. And the constitution of this already great union pledges it the "promotion of the practice of truthfulness, justice and economy in production and exchange: (1) By the abolition of all false dealing, either direct or indirect; (2) by conciliating the conflicting interests of the capitalist, the worker and the purchaser, through an equitable division among them of the fund commonly known as profits; (3) by preventing the waste of labor now caused by unregulated competition." No society is admitted to the union unless it agrees to accept these principles as its guiding rules of business.

There is thus established a system which promises in good time to solve the most difficult economic problems of the age, and to find a common standing ground for capital and labor. And the absolute quietness and business earnestness with which co-operation in England is conducted augurs well for the results. There is no question of demagogism, no mountebank pretenses, no political hypocrisies to confuse and entangle the movement. It goes forward upon its simple merits, and it is successful because it contains the best elements of success. Why co-operation has failed to take root in the United States is one of the questions which provoked much speculation, but for which no satisfactory explanation has thus far been given. Perhaps the time is not ripe for it yet, but its results in England are so unquestionably beneficial that the movement seems certain to spread eventually, and to be taken up by labor wherever it is free to follow its own devices and to work out its own salvation.

A Frightful Mine Catastrophe.—On the 20th inst. the Buckridge anthracite coal slope, sunk in 1874 by May, Audenreid & Co., of Shamokin, Pa., and now owned by the Philadelphia and Reading Coal and Iron Company, was found to be on fire. The slope is 1500 feet deep and the fire originated in the fan-house at a depth of 1200 feet. The flames ascended rapidly and soon issued from the mouth of the slope. As the timbers supporting the roof of the mine were consumed heavy falls of coal occurred and the roar of the fire was heard quite a distance. On the same day the Coal and Iron Company took possession of the Greenback colliery, located near by, and a hole was started from that colliery into the workings of Buckridge, a distance of 36 feet, so that running creek could be turned into the mines through this hole. The damage to Buckridge slope will be very heavy. Seven hundred men and boys are thrown out of employment. On the 21st, while a number of men were engaged in boring the hole above referred to, the gas suddenly poured in from the burning mine, and, before they could escape, six men and one boy fell victims to the deadly fumes.

Marvelous Engineering.—The London Inner Circle Railroad is a marvelous feat of engineering skill, says the Philadelphia Press. It runs throughout its entire distance under the busiest center of the largest city in the world, and the operations attending the excavation and construction have proceeded without serious injury to or interruption of business or traffic. Quicksands have had to be passed through, beds of old rivers spanned, lofty warehouses and massive buildings secured while their foundations have been undermined, and an intricate network of gas and water pipes sustained until supports had been applied to them from below. Added to this the six main sewers had several times to be reconstructed. Day and night the work has been carried on for 18 months, and now the engineers are able to announce that their tunnel is complete. The laying of the rails and the building of the stations are the only portions of the immense work that remain to be done, and in a very short time trains will be passing over the whole of this wonderful subterranean road.

The Japanese Government is about to make an important step in improving trade with the western world. The announcement is made that, in consideration of an immediate modification of the treaty negotiated with England in 1858, touching the separate jurisdiction of the five treaty ports, Japan is prepared to throw open the entire country and to remove all restrictions upon foreign residence, travel and trade. We are not informed as yet what these required modifications are; but that the Government of that country, under any circumstances, should thus offer free communication to all the rest of the world must be accepted as another long stride forward in the path of civilization and progress. Japan just now takes from us little besides petroleum, but with the whole country thrown open to commerce, there can be no question that our trade could be greatly enlarged.

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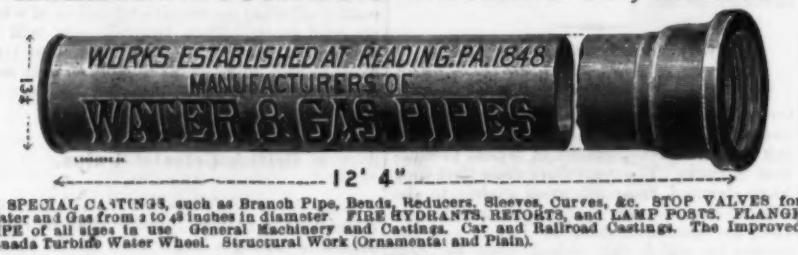
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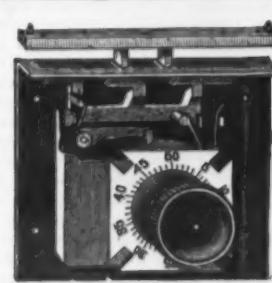
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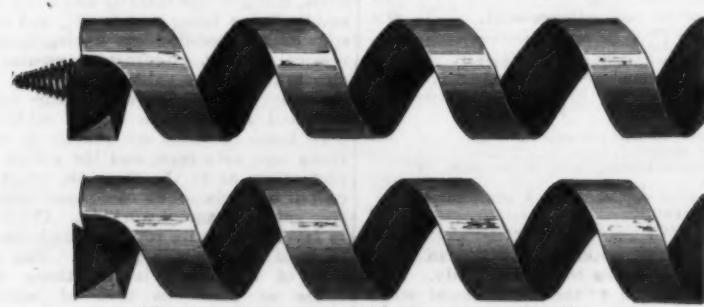
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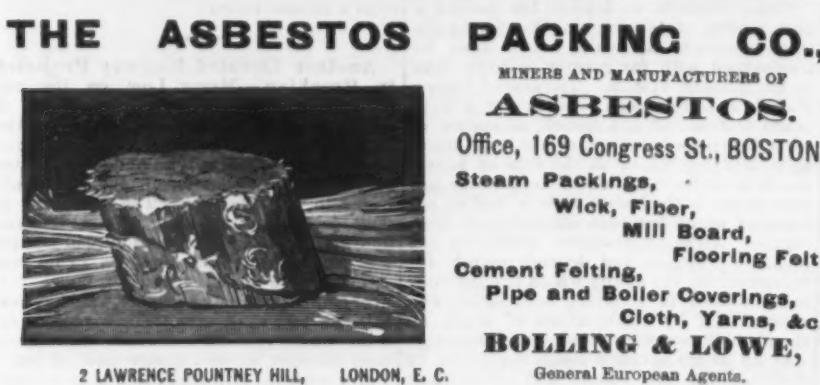
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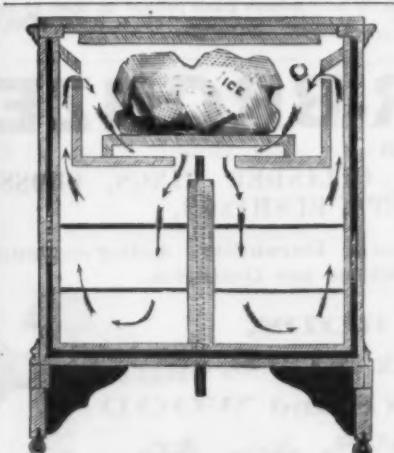
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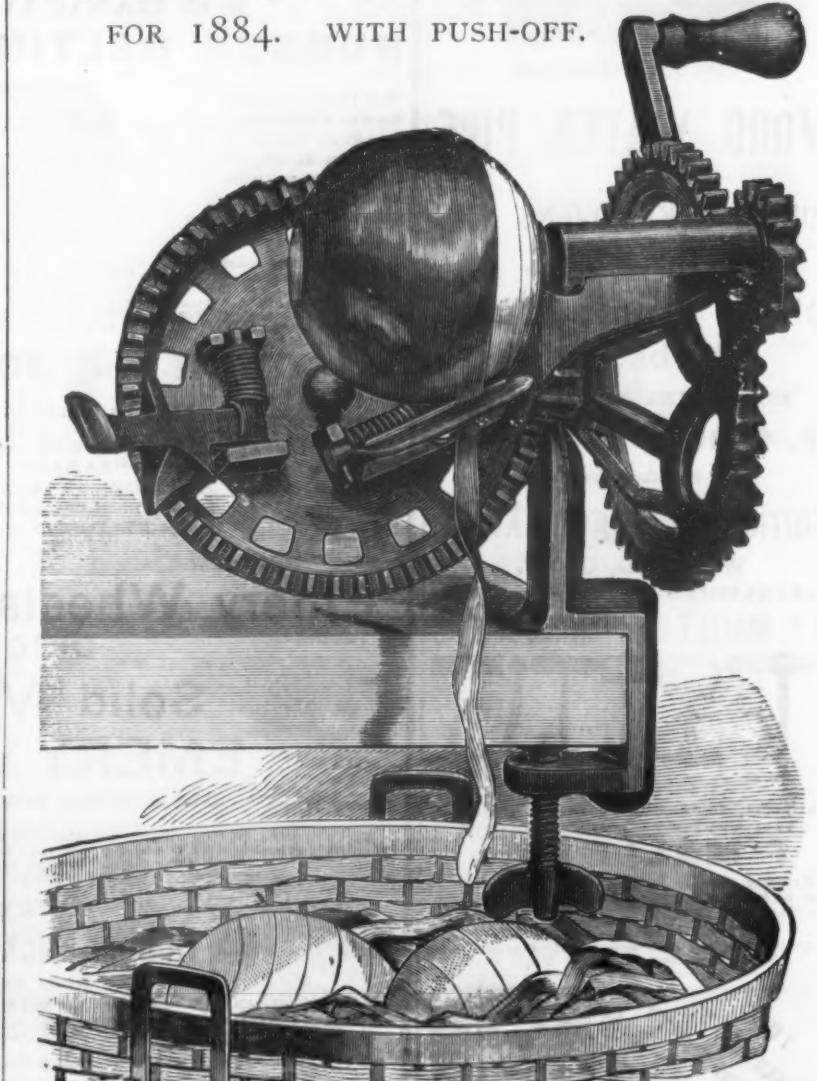
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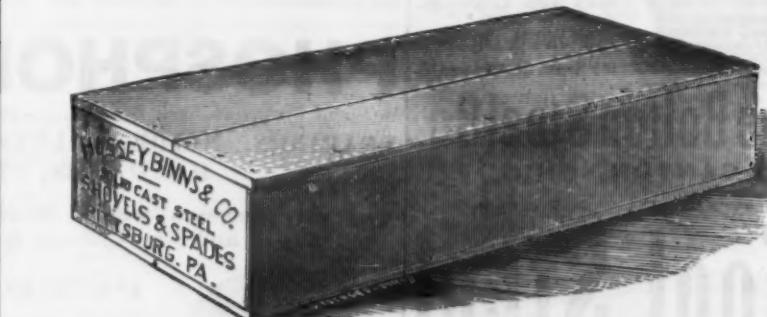
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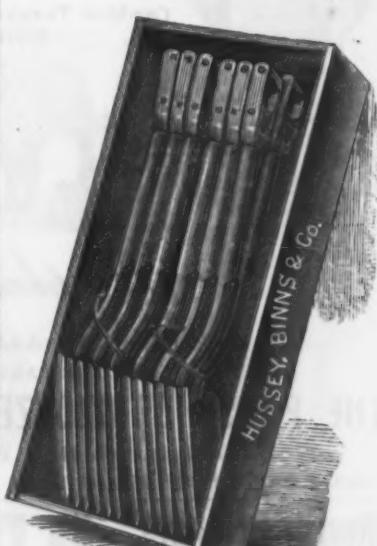
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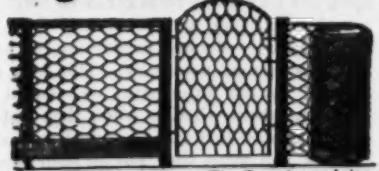
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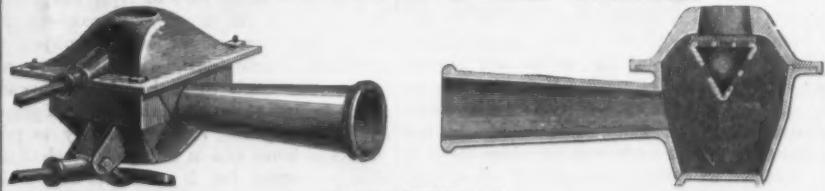
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New Inventions.

In a wheel-hoe patented by S. Fuller, of Danvers, Mass., a pair of weeder or hoes can be independently or simultaneously adjusted in a direction at right angles to the line of travel while the machine is traversing the ground. The frame of the machine consists of two longitudinal bars, under each of which runs a rod provided at the upper end with a suitable handle. At the lower end each rod is connected to a weeder bar that is made in one piece with a bent or curved weeder. The operator can, by the handles, bring the weeder closer or further apart to avoid obstructions or to weed larger or smaller plants.

The Thorn Wire Hedge Company, of Chicago, Ill., have procured the exclusive right in a new twister and spooler for the manufacture of wire fencing. The machine twists or spins two or more strands of wire together and winds the twisted wire upon a spool, and is especially designed to be employed in the manufacture of wire fencing. The frame of the twister carries two disks, which hold the spool between them. One disk has a central axial aperture, through which the movable spool-shaft freely passes, and which allows the disk to adjust itself inwardly against the end of the spool. The other disk is locally stationary—that is to say, it has no movement except a rotary one upon its axis. This disk is rotated by suitable spur-gear connections.

A new article of tableware patented by L. Chevalier and L. Graillot, of Paris, France, is adapted to grasp the bone of a cutlet, a leg of chicken or the like. The device consists essentially of two grooved grasping jaws, which are attached each to a spring blade. These blades are riveted at their end, and act to hold the jaws apart. A sheath or hollow tube encircles the blades. By a finger piece the blades may be pushed to any desired extent into the sheath and locked in position. The further the blades are pushed into the sheath, the closer will the jaws come together. They may be thus made to firmly grasp the article placed between them.

A coating for wire to be applied preparatory to drawing consists of a solution of dextrine and alum, mixed with flour or meal. The proportions used are 1 to 2 pounds of dextrine, and from $\frac{1}{2}$ to $\frac{1}{4}$ ounce of alum to each 100 pounds of flour. This coating, it is claimed, flows evenly over the surface of the wire and sets quickly. It therefore does not run to the under side of the wire in drying, and produces a better lubrication. B. F. Aiken, of Millbury, and C. W. Newhall, and George W. Ellis, of Worcester, Mass., are the patentees of the above solution.

A warning plate for wire fences, patented by S. Forrester, of Allegheny City, Pa., is so constructed that it may be seen from every direction. As now generally made, these plates are flat and are only useful when a view of their faces is presented, while when accidentally turned they become nearly invisible. The blank of the new plate is, by two peculiar cuts, divided into two sections, each section having a portion of its body on each side of the connecting line. Thus made the plate is inserted between the strand wires, and the latter are twisted into notches formed on opposite sides of the plate. The sections are then bent until their planes are at right angles to each other. The plate will now present faces in four different directions, and, by indenting their salient edges, they may be also used as bars.

A metallic fence in which wire and metal strips are interwoven is made as follows: First, two horizontal wires are stretched, and the diagonal wires are attached to the upper and lower wires, respectively, and crossed and recrossed to form the usual diagonal filling. At the several points where the diagonal wires are twisted around the horizontal wires barbed slats are woven in, which slats form the uprights of the fence. D. A. Roach, of Crawfordsville, Ind., has patented this fence.

A new carpet stretcher consists of two curved pointed arms, joined together and connected at the joint with a third arm, ending in a toothed stretching jaw. The pointed arms are first thrust through the carpet, and give proper bearings for the toothed arm, which is made to grasp the carpet between them and push it toward the wall. This stretcher is patented by J. A. Dunnell and A. Smith, of Boston, Mass.

R. H. Beach, of Flint, Mich., is the patentee of a forging machine for forging a variety of small articles. In this machine a heated piece of iron is first pressed between registering dies secured to a plating mandrel and stakes, and is then trimmed off by a similar operation between another die and a punch. By doing away with the blow of the plunger or hammer, and substituting pressure therefor, chilled dies may be used, which are much cheaper than the cast-steel dies used to withstand the heavy blow from a hammer. Another advantage of this machine is that it combines both the forging dies and trimming dies, and avoids thereby much unnecessary handling.

A hay, manure or like fork, with removable tines, has been invented by G. Pickhardt, of Westphalia, Germany. Each tine has an enlarged end or shank with beveled edges and made tapering from the tine outward. The shanks fit into tapering dovetailed grooves formed in the rear side of the fork-head. In this manner the tines can be firmly secured to the head, and to prevent their accidental dropping out they may be locked by striking the flat face of the tines a blow or two with the hammer, to slightly spread and wedge the shanks in the grooves. The tines may be removed at any time by simply striking their projecting ends with a hammer. If desired, set-screws may be employed for securing the tines more perfectly in position.

The Rogers Fence Company, of Springfield, Ohio, are the patentees of an improved iron fence, made with double horizontal rails and without any ornamentation. The upright picket rods are square in cross-section and are inserted between a pair of horizontal rails also square in cross-section. Between every two uprights there is a spacer consisting of a bar of the requisite length. The spacer is made narrow, with its vertical diameter much the greatest. At each end it

has an angular fork which straddles one of the corners of the uprights, and in the rear of this, upon either side, is a laterally-extending spur or lug which inclines downward. To secure the spacer, uprights and rails together a clip-band is used, which is applied over the middle of the spacer bar.

A hand-saw invented by C. A. Fenner, of Mystic River, Conn., is so arranged that, if the handle is turned, a positive revolving motion is imparted simultaneously. This is of importance in such operations as marqueterie sawing, where it is necessary that the saw blades shall be turned in various directions while the operation of sawing progresses. The saw consists essentially of a frame, two spindles having their bearings in said frame, the saw blade secured to said spindles and chain mechanism for connecting the handle to the opposite spindle.

H. A. Schwabes, of Chicago, Ill., has patented a carpet fastener which consists of a hook that is sewed to the under side of the carpet. The end of the hook is provided with a hinged extension, which may be folded back. The hook is first inserted into an eye screwed into the floor, and the extension is then turned in, so that the hook cannot be accidentally displaced. This fastener is also well adapted to stair carpets. An advantage claimed is that in using it the carpet need not be stretched unduly, as is the case with many of the old fasteners.

A shovel of the kind having a long straight handle has been patented by F. W. Hudson, of Leominster, Mass. The object of the invention is to prevent tipping of the blade, whether the handle is grasped high or low. For this purpose the handle is provided at its lower part with a rib in front and at its upper part with a rib in the rear. These ribs allow a firm grasp. They are arranged in this peculiar way in order to prevent the loaded blade from pressing the ribs into the hand.

An improvement in sheep shears made by W. F. Wickenden, of San Luis Obispo, Cal., relates to a device for holding the blades apart during grinding. This class of shears is made so that the blades remain normally open, but not open far enough to permit grinding. The present custom to accomplish a wider separation is to insert a cross-stick between the shanks. But this stick is liable to become loosened, and the blades being released come together and frequently cut the hand of the operator. In order to overcome this difficulty the inventor pivots a brace-rod at one end to the shank of one of the blades. The free end of this rod fits into a recess or socket on the shank of the other blade. When the brace is free it lies within that shank to which it is pivoted, and is out of the way, but when it is extended it holds the blades wide apart. The brace is prevented from swinging loose by a spring which bears against it.

G. Freund, of Durango, Col., has invented a pocket-knife for miners' use, to facilitate the cutting and capping of a fuse and for similar purposes. One of the blades is provided with a screw-threaded recess. The handle case has two notches, of which one, which is near the end of the handle case, is deeper than the other. If a fuse is to be cut it is placed into the last-named notch, and the blade is folded down to cut off the fuse. The end of the fuse is then placed into the first notch after the blade has been raised, and then the blade is again folded down, and thereby presses thread into the end of the fuse. The knife is also provided with a spoon blade for digging out giant-powder candles to receive the fuse.

A new barbed wire is made with U-shaped collars slipped over and clamped to the strand wires. The collars are made with one flattened surface, and the bars are coiled on the strand wires and over the collars in such a way that they lie diagonally across the flattened surface of the collars. The prods of the bars are then coiled back in opposite directions, forming a neat and compact two-point barb. The flattened part of the collar prevents any rotation of the barb on the strand wires, while the collar itself prevents lateral motion of the barb. A patent for this construction has been granted to C. B. Brainard, of Joliet, Ill.

A tack hammer with a hollow handle to receive the tacks is a novelty lately patented. The mouth of the handle is closed by a spring plug which is readily removed. The hammer is well adapted for household use, and does away with the employment of a separate receptacle for holding the tacks. It is the invention of G. S. Yingling, A. D. Flack and H. T. Heller, of Tiffin, Ohio.

A kerf clearer for saws, invented by J. Smith, of Philadelphia, Pa., consists of a strip of metal which is adapted to the throat of the tooth and is fitted at each end into a slot in the blade. The strip is made of steel, and possesses slight elasticity. It is applied by first contracting it, then slipping the ends into the slots and finally releasing it, and, being wider than the retainer is thick, presents two ribs which clear away the sawdust. Heretofore it has been the practice to swage the concave edge of the retainer in the throat of a tooth, so as to form on each side a rib for clearing away the sawdust. This swaging is a tedious and costly operation for which the patented clearer is claimed to be an economical and effective substitute.

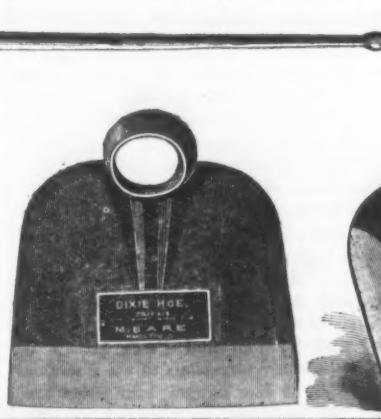
The celebrated Egyptian explorer Petrie has just discovered a colossal statue of Rameses II, which, when whole, must have been the largest stone statue ever known in the world, its altitude from foot to crown having been 98 feet. It was a standing figure of the usual type, wearing the crown of Upper Egypt, and with its pedestal had an extreme height of 115 feet. It was a monolith and came from the quarries of Syene, like the great obelisks and pillars of Luxor, and, according to the most careful computation, it must have weighed about 700 tons. It has been mutilated and despoiled beyond recovery, and its fragments built into the propylion of a temple erected by the sovereign of later dynasty.

According to a cable dispatch from London, dated August 20, Postmaster-General Fawcett has informed the various steamship companies that the present arrangements for carrying the mails to New York will be continued for another year.



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It has Six New and Very Useful Improve-
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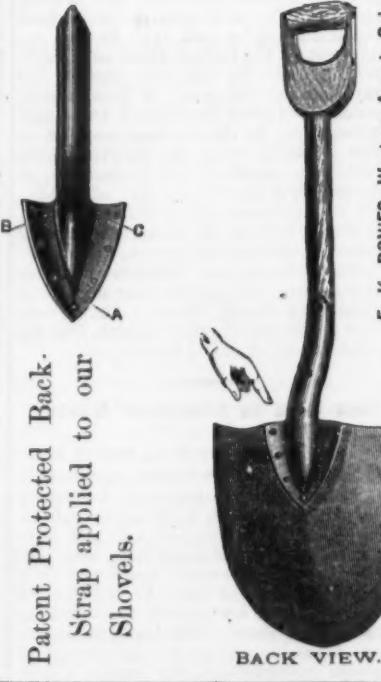
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Durable, Easily Worked, Rapid.
No Spring Cutters, No Stopping
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Doubles Working Capacity of Lathe.

The SPECIALTY MFG. CO., Sole Manuf., and Prop.,
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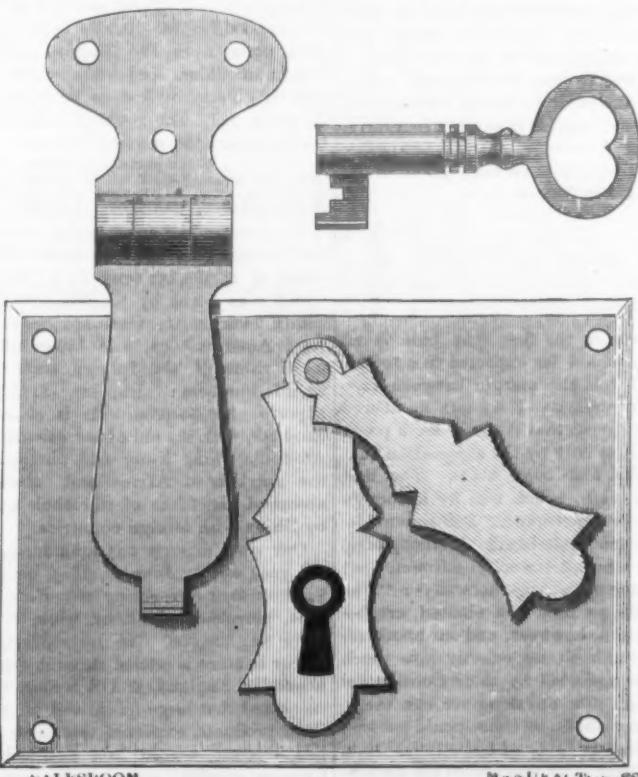
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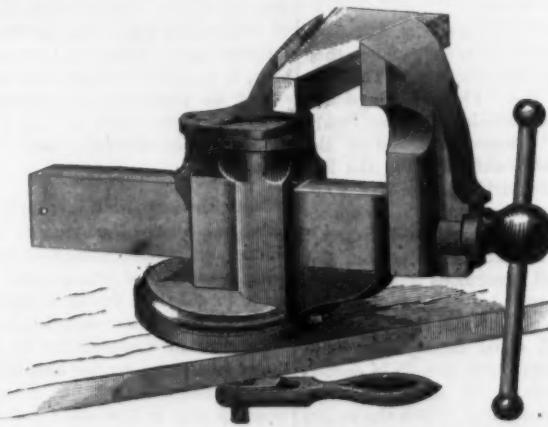
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ATHOL MACHINE CO., Manufacturers, Athol, Mass.

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August 28, 1884.

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 One Engine Lathe, 15 in. x 6 ft. New.
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 One Engine Lathe, 14 in. x 4 ft.
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 One Engine Lathe, 12 in. x 5 ft.
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 Two Spinning Lathes.
 One Crank Planer, 21 in. x 3 ft. 6 in.
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 One to 10 Upright Drill.
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Capital Stock, \$200,000.00.

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In one of the most flourishing cities of the Gulf States, a well-assorted, clean stock of Hardware, Stoves and Tinware. An old, well-established business at a good location, with a good run of trade. Stock will invoice \$18,000 to \$20,000.

Address: "SOUTHERN BUSINESS,"

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The largest stock of New and Second-hand Engines, Boilers, and general Machinery in the West. Send for Catalogue. Hoisting Outfits for Coal Mining and other purposes a specialty.

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DROPS and LIFTERS.

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Wanted.

By a competent Salesman to represent some first-class manufacturers in the South and Southwest. Have had experience in the Hardware Trade, and a practical man with machinery. Good references given.

Address: "LOCK BOX 1753,"

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Wanted-Partner,

either active or special, with \$25,000 to \$40,000, to join an established wholesale Hardware business in the West. A good opportunity for party desiring investment.

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WILL OFFER below market rates the following:

NAILS,

LOCKS,

SCREWS,

AND STRAP AND HINGES.

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Wanted.

Machine and Boiler Maker to work new and very important invention of Railway Appliance.

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FIRM of English merchants and manufacturers require, January 1, 1885, an agent in New York, to obtain orders for English Saddlery, Sheep Shears, Chains, General Hardware, &c. Payment by commission. Security and references required. Apply

BOX 21 Post Office, Walsall, England.

Trade Report.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, August 27, 1884.

Scotch Pig.—The market is a little steadier.

We quote makers' brands as follows:

Coltneess, alongside, Glasgow..... 60/-

Langlois, " " " 55/-

Gartsherrie, " " " 53/-

Summerlee, " " " 52/-

Carnbroe, " " " 50/-

Glengarnock, " Ardrossan..... 44/-

Eglinton, " " " 47/-

Dalmellington, " " " 36/-

Shotts, " at Leith..... 36/-

Lighterage from Ardrossan to Glasgow is 1/- ton.

Cleveland Pig—Continues irregular.

Prices are unchanged. We quote as follows,

f.o.b. shipping ports:

Middlesbrough, No. 1 Foundry..... 41/-

" No. 2 " " 39/-

" No. 3 " " 37/- @ 37/6

" No. 4 Forge..... 36/-

Bessemer Pig—Market continues irregular. We quote W. C. Hemmings 44/6 @ 46/- for mixed lots, Nos. 1, 2 and 3, equal portions, f.o.b. shipping ports.

Manufactured Iron.—The market continues irregular. We quote at works:

Staff. Ord. Marked Bars... 7 10 0 @ 7 6

" Medium " " 6 0 0 @ 6 10 0

" Common " " 5 10 0 @ 5 15 0

Hoops, 20 W. G. and over.

" Common Best..... 5 15 0 @

" Medium..... 5 5 0 @ 6 10 0

" Common..... 6 0 0 @ 6 7 6

Sheets, 20 W. G. and under.

" Ordinary Best..... 7 15 0 @ 8 5 0

" Common..... 7 0 0 @ 7 10 0

Welsh Bars..... 4 17 6 @ 5 2 6

Steel Rails—Are unchanged. Ordinary Sections are quoted at £4. 15 @ £4. 17/6, f.o.b. shipping ports.

Old Rails—Are unchanged. We quote Old D. H.'s, £3 @ £3. 5/-, c.i.f. New York.

Scrap.—The market is unchanged. Heavy Wrought is quoted £2. 10 @ £2. 15, c.i.f. New York; Bessemer Crop Ends, run off the mill, are quoted 52/6 @ 54/6, f.o.b. shipping ports.

Copper.—The market is not so steady.

We quote Best Selected, £58. 10/- @ £59.

and Chili Bars, £53. 15/- @ £54. 5/-

Tin.—The market is a little weaker. We quote Straits Ingots, spot, £82, and futures, £82. 15/-.

Freights.—Steam from Glasgow to New York, 3/-; Liverpool to New York, 5/-; Liverpool to Philadelphia, 5/- @ 6/-, and London to New York, 7/6 @ 9/6.

Financial.

Office of The Iron Age,

WEDNESDAY EVENING, August 27, 1884.

Tin Plates—Are unchanged. We quote Tin Plates, 10x14, 1st qual. Charcoal..... 19/6 @ 21/6

" 2d " " 18/6 @ 19/6

" 1st " Coke..... 17/6 @ 18/6

" 2d " " 15/3 @ 15/0

Spelter.—The market is quiet. We quote Ordinary, at shipping ports, £14 @ £14. 5/-.

Lead.—The market is steady. We quote Common English Pig, £11. 5/- @ £11. 10/-.

Freights.—Steam from Glasgow to New York, 3/-; Liverpool to New York, 5/-; Liverpool to Philadelphia, 5/- @ 6/-, and London to New York, 7/6 @ 9/6.

The imports of foreign merchandise at this port during the past week were moderate, their total being \$7,663,171. Dry goods continue to come in rather freely, the receipts amounting in value to \$2,617,113. The receipts of most of the leading items of general merchandise were of ordinary proportions. Since January 1 the imports aggregate \$287,798,881, against \$305,236,519 for the same time last year.

The exports of domestic produce from this port during the past week were somewhat above the usual average, their total being \$6,899,408, against \$8,623,298 for the same time last year. There is a free outward movement of wheat, but the exports of the other leading items have fallen off somewhat as compared with the previous week. Since January 1, the total is 12,665,658,807, compared with \$233,829,710 for the corresponding period of 1883. According to the Custom House report, the total imports for the fiscal year were \$705,123,955, and the total exports \$807,640,992, leaving a balance of trade for the fiscal year in favor of the United States amounting to \$102,523,037. From present indications July in the new fiscal year will give a considerable balance in our favor, instead of \$4,250,000 against us as there was last year. August does not promise so favorably, but the two months together will be an improvement, compared with the corresponding months in 1883.

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Trade Report

Philadelphia.

Office of *The Iron Age*, 229 South Fourth St.,
PHILADELPHIA, August 26, 1884.

Pig Iron.—The market has been rather more active during the past week, and prices are probably a shade steadier. Along the entire line there seems to be more inquiry and more interest in the market, but sales have not been materially larger than during several weeks immediately preceding. The indications point to a heavier business, notwithstanding, as consumers are all running close on their stocks, and must therefore buy from time to time, according to their requirements. In point of fact, it begins to look as though the demand would show some little improvement during the next six or eight weeks, although not to an extent likely to affect prices. The declining tendency seems to have been checked already, but beyond that there is no reason to anticipate further change for the present, at all events. The belief that prices have touched bottom is becoming more widespread, however, and it would be no surprise to many if there should be a slight upward movement later on in the season. Meanwhile, there has been nothing beyond the usual routine demand for small lots, and it remains to be seen whether consumers will abandon the conservative attitude which has served them so well during the past 12 or 18 months. A steady buying movement among consumers for a few days would doubtless have a marked influence upon values, but that can hardly be expected, unless there is a decided improvement in general business, which, while hoped for, and reasonably probable, is by no means a certainty. The present movement may be a "little spurt," or it may be the forerunner of an active fall trade-time only can tell which. Prices are not materially different from what they were a week ago, although the extreme figures are still rather wide apart. No. 1 Foundry varies from \$18.50 to \$21, delivered at tide, with \$19.50 @ \$20 as the ordinary rates for good average qualities. Higher and lower figures, which are not infrequent, depend upon quality and character of brand. No. 2 Foundry is dull and freely offered at prices ranging from \$17.50 to \$19, with the majority of sales of good brands at from \$18 to \$18.50. Mill Irons are also in large supply, medium grades particularly, at from \$16.50 to \$17, while \$17.50 to \$18 is asked for the best brands of Gray Forge. Sellers are disposed to encourage business, however, and when large lots are likely to be taken prices are shaded accordingly, but, on the whole, the feeling seems to be more encouraging than for some time.

Foreign Iron.—There is very little doing at present, and prices are almost nominal. Sellers are anxious for firm offers and are asking \$19 @ \$19.50 for Bessemer, \$20 @ \$21 for special brands, \$27.50, for 20% Speigleisen, and \$23 @ \$23.50 for 10% to 12%.

Blooms.—The market is a trifle more active, although prices vary according to quality. Best qualities are held at firm prices; other descriptions can be had at concessions of \$2 or \$3 $\frac{1}{2}$ ton from quoted rates, which are about as follows: Charcoal Blooms at \$53 @ \$55; Run-out Anthracite, \$43 @ \$45; Scrap Blooms, \$40 @ \$42; Northern Ore Blooms, \$38 @ \$40.

Muck Bars.—There is a fair movement in small lots, usually at \$20.50 @ \$30 at mill, but there are sellers at less money for some qualities.

Bar Iron.—The demand is not satisfactory to manufacturers, although in one way or another a pretty fair business is done. It is unprofitable, however, both as regards price and character of orders, which are small and spasmodic. Some days there is quite a rush, then follows a pause, so that manufacturers are in a chronic condition of uncertainty—one week busy, another week dull, with nothing tangible to build upon. Unfortunately, there are no indications of any material change in the near future, so that prices are likely to remain as at present, say 1.9¢ for Best Refined Bars and 1.7¢ @ 1.8¢ for Common and Medium, with some slight reduction when the order is desirable as to size and specification.

Plate and Tank Iron.—Without any orders of importance during the week, the market has been held pretty steady at about last week's figures. The demand is for small lots, but sales have been about equal to the week's output, so that there is no change of feature worth noting. Inquiries seem to indicate a continuance of the present condition of things, with prices as follows, subject to some little allowance on large lots, viz.: Plate Iron, 2.1¢; Tank, 2.15¢; Shell, 2.75¢; Flange, 3.75¢; Fire-Box, 4.25¢.

Structural Iron.—Business shows very little change from what it was a week ago. Manufacturers have so little work on hand that they are constantly on the alert for new business, and what little comes in is only about sufficient to keep them moving. There are exceptions, of course, but the average demand is not more than from one-half to two-thirds of the capacity for production, so that competition is close and prices cut to the lowest figures possible.

Sheet Iron.—The demand for Heavy Sheets is pretty well maintained, but other

descriptions are dull and somewhat irregular. Large lots can be had at the usual concessions, small lots as follows:

Best Refined, Nos. 26, 27 and 28	4¢
Common, 1/4¢ less than the above	3 1/4¢
Best Bloom Sheets, Nos. 26 to 28	6¢
Best Bloom Sheets, Nos. 22 to 25	5 1/4¢
Best Bloom Sheets, Nos. 16 to 21	5 1/4¢
Common Red Plates, 8-16 to 16	2 1/2¢
Blue Annealed	2 1/2¢
Second quality, discount	50¢
Common	57 1/2¢

Wrought-Iron Pipe.—There is some increase in the number of small orders booked from day to day, but no very general improvement. The market is so bare of large orders and competition so sharp for even small lots that prices are weakened and the combination discounts practically ignored. Nominally, however, the following prices rule: Butt-Welded Black Pipe, 30%; Butt-Welded Galvanized, 20%; Lap-Welded Black, 50%; Galvanized, 35%; Boiler Tubes, 47 1/2%.

Steel Rails.—A considerable amount of business has been entered during the past week, probably 30,000 tons all told, chiefly by manufacturers in Eastern Pennsylvania. Report says that \$26 was accepted for large lots, but it is difficult to find out what the actual figures were. There are sellers at \$27 to day, and, while lower figures may have been accepted, manufacturers who may be supposed to be well posted on the subject say that they have no personal knowledge of anything as low as \$26. A good many inquiries are being made from day to day, and it is thought that large orders will be entered in course of a few days. Meantime, \$27 @ \$28 is asked, according to quantity, delivery, &c.

Crop Ends.—Prices are weak and sellers anxious for business, at about \$20.50 for shipments of English or German, and \$19.50 for Welsh, with a possibility of still lower prices on firm offers for 500 to 1000 ton lots. American Crops are nominally \$20 at mill.

Old Rails.—There has been rather more activity during the past week, and lots afloat, nearly due, have sold at \$17.50 @ \$18 for T's. Spot lots would probably bring higher prices, as there is more demand and nothing available at less than \$19 @ \$19.50. The market is very uncertain, nevertheless, and, while the tone is decidedly strong today, two or three lots of a few hundred tons each might cause a quick reaction in the opposite direction.

Scrap Iron.—There is not much doing, and prices are barely steady at about the following prices asked: Cargo lots, No. 1, \$19 @ \$19.50; No. 1 Selected, \$20 @ \$21, and Machinery Scrap at \$15 @ \$15.50; Cast Turnings at \$20.50 @ \$20, and Wrought Turnings at \$15 @ \$16.

Nails.—The demand is fair for the season but prices continue weak and irregular. This state of affairs is due principally to new mills seeking trade at low prices, which makers of established reputation do not feel inclined to meet. There is some talk of closing the mills rather than sell Nails lower, unless there is a reduction in raw material, but the disposition in the trade is to hold out and do the best they can under the circumstances; meantime prices range from \$2.20 to \$2.35, with occasional offerings by new concerns at \$2.15.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Avenue,
PITTSBURGH, PA., August 26, 1884.

There has been no important change in the general Iron situation during the past week; both mill owners and furnace men, almost without an exception, continue to report business as dull and unsatisfactory.

While the demand continues unusually light for the season, the chief cause of complaint is in regard to prices, which under the most favorable circumstances afford little or no margin for profit. Cost of production has been reduced to about the lowest possible limit, and as soon as this is more generally understood and buyers become satisfied that prices have reached bottom, there will, without doubt, be an increased trade. There is no abatement in the putting down of natural gas wells, and the indications are that our manufacturers generally will be using it both as light and fuel before another year goes around. The number of natural gas companies is steadily increasing, and as it is not the intention to let any one company have a monopoly, but as far as possible to place all on an equal footing, consumers will have the advantage of an active competition. Advices from the West and South in regard to business, say that while there, as here, it is dull, hopes are entertained of an early change for the better.

The Coal Valley Coal Company, it is probable, will get the three years' extension asked for. They propose to pay 15% in nine months and regularly every three months thereafter until it is all paid. Liabilities estimated at about \$300,000. The Dunbar Coke Company have made an assignment. The Coal and Coke trade is feeling the depression like all other interests.

Iron Ore.—This branch of trade continues very dull, and the outlook is not favorable for any immediate improvement. No. 1 Specular and Magnetic (Bessemer) Ores are still quoted at \$5.50 @ \$6.50 $\frac{1}{2}$ ton on dock at Cleveland; No. 1 Specular (non-Bessemer), \$5 @ \$5.50. Freight from Cleveland to Pittsburgh, \$1.50 $\frac{1}{2}$ ton.

Pig Iron.—The most and about the only new feature to note is an increased disposition on the part of consumers to buy and less

disposition on the part of producers to sell. It is evident that the former have begun to be impressed with an apprehension that hard pan has been reached and a reaction possible; and the latter, for the same reason, are less anxious about selling. Consumers are still able to buy in a regular way at ruling prices, but so far as we can learn very few, if any, of the furnaces are willing to contract for future delivery at prices now obtainable. One of the strongest points in favor of the producer is the materially reduced production, and, while there are a number of furnaces ready to blow in short notice, it is not likely that they will do so in the present condition of affairs, but, on the contrary, some of those now in blast are expected to blow out shortly. A couple of important sales were reported during the week—1500 tons Standard Neutral Forge, at \$16.00, cash, and 1500 do., at \$16.50, 60 days. No. 2 Mill Irons are to be had at \$15 @ \$15.50, cash. Quotations may be fairly given as follows:

Neutral Mill Iron	\$16.00 @ \$16.50, 4 mos.
All-Over Mill	17.50 @ 18.50, 4 mos.
White and Mottled	15.00 @ 15.50, 4 mos.
Foundry Irons	17.50 @ 19.00, 4 mos.
Cold-Blast, Charcoal	25.00 @ 28.00, 4 mos.
Bessemer Iron	18.00 @ 19.00, 4 mos.

Muck Bar.—There have been no sales reported during the past week, in the absence of which we continue to quote at \$29 @ \$30, cash, at mill.

Manufactured Iron.—Some manufacturers report an increased demand, while others, and these are in the majority, complain of continued dullness, and all agree that prices are unremunerative, the latter being the most serious cause of complaint. The best makes are still quoted on a basis of 1.65¢ @ 1.75¢ rate for Bars, but poorer qualities are being sold on a considerably lower basis. Skelp Iron is being sold at from 1.75¢ @ 1.8¢. Some of the mills have been working almost exclusively on Skelp all the year, and but for it they would have had little or nothing to do. But few, if any, of the mills are running full. The most of them are working single turn; some, including the Veauvian and Keystone, are standing idle.

Nails.—Some of our manufacturers report an increased demand, and the indications are that there will be at least a fair degree of activity from now until December. It appears to be generally believed that the market is down to rock bottom, and, with light stocks in the hands of jobbers, manufacturers are of the opinion that they will be able to hold the market well in hand from now on until the advent of the winter season. We continue to quote at \$2.10, 60 days, 2 1/2% for car lots and upward, and 5¢ @ 10¢ $\frac{1}{2}$ keg additional in a jobbing way.

Wrought Iron Pipe.—There appears to be an increasing demand, but since the collapse of the combination competition is active, and the cutting of rates is now the rule. Prices have further declined, and we now quote discounts as follows: On Black Butt-Welded Pipe, 40%; Galvanized do., 35%; on Black Lap-Welded Pipe, 60%; on Galvanized do., 45%; 2-Inch or Well Tubing, 13 1/2¢ foot, net; 5 1/2-Inch or Well Casing, 45¢ $\frac{1}{2}$ foot, net.

Steel.—There is but little that is new to note in connection with this important interest; demand only fair; prices unchanged. Best brands of Refined Cast Steel, 9 1/2¢ @ 10¢; Crucible Machinery, 5¢ @ 5 1/2¢; Open-Hearth and Bessemer do., 2 1/2¢ @ 3¢. We can report a sale of Steel Nail Slabs at \$32 $\frac{1}{2}$ ton; this latter is for making Steel Nails.

Steel Rails.—So far as we can learn there have been no sales made in this market below \$28, cash, at mill, for heavy sections.

Old Rails.—The last sales of Old Iron Rails reported were at \$20.50, which appears to be the ruling price. Mixed lots of Steel Rails are quoted at \$17 @ \$18, and good, even lots at \$19 @ \$20.

Crop Ends.—Are still quoted at \$18 @ \$18.50 $\frac{1}{2}$ ton for American.

Railway Track Supplies.—Continue dull, and it is intimated that desirable orders can be placed below the rates quoted: Spikes, 2.35¢, 30 days; Splice Bars, 1.65¢ @ \$1.75¢; Track Bolts, 2 1/2¢ @ 2 1/2¢.

Scrap.—Trade continues light and prices weak, but unchanged. No. 1 Wrought Scrap, \$19 @ \$20, net ton; Old Car Axles, \$27 @ \$28; Wrought Turnings, \$15 @ \$16; Cast Borings, \$12 @ \$12.50, gross ton; Old Car Wheels, \$16.50 @ \$17, gross ton.

Window Glass.—Continues very dull for the season, but an increased demand is looked for soon. No change in prices. Discount on Double Strength in carload lots, 70 and 5%; on Single Strength, 60 and 10%.

Coke.—A slight improvement in demand is reported, but business is far from being satisfactory. About 55% of the ovens, both in and outside of the syndicate, are running. Blast Furnace Coke is still quoted by the syndicate at \$1.10 $\frac{1}{2}$ ton on cars at ovens.

Chicago.
Office of *The Iron Age*, 26 and 38 Clark St.,
Cor. Lake St., CHICAGO, Aug. 26, 1884.

Hardware.—During the past week there has been a little improvement over the previous one. Mail orders are increasing in number and quantity ordered. Buyers are more frequently seen on the street, and business in the large jobbing houses is assuming a more active appearance. Among goods to be shipped can be found Measures, Scoop Shovels, Manure Forks, Axes, Picks, Anvils

and a general assortment of Heavy Hardware. Trade in Axes is not heavy, though inquiries are growing. In Blacksmiths' Tools there is a fair trade, that promises to be much better in the near future. There is nothing of importance to note in prices. Some few changes have occurred in the manufacturers' lists, which have been mentioned elsewhere in our columns, all of which were of a downward nature. The market is in a very fair condition, and present demand all that can be expected for the season.

Barb Wire.—There is no change to note in Barb Wire. Stocks are in good supply and demand light. There is no movement on the part of manufacturers, so far as heard from, to start up their factories or to make a combination price. The market is greatly demoralized on all points, and in no particular does it show any feature of improvement. Painted is quoted at 4 1/2¢ and Galvanized at 5 1/2¢, carload lots. In a jobbing way 1/2¢ additional is asked.

Nails.—An increasing demand is reported in the Nail market. The weakness in price, however, confines the majority of sales to small lots, which usually can be had at nearly the same price as larger quantities. Carload buyers are not satisfied that present prices are bottom, and always look for additional concessions. During the week \$2.25 was the ruling figure on car lots, but sales have been reported at \$2.20, and less on some inferior stocks which had been disposed of in job lots. From store, in a small way, \$2.30 is asked. Steel Nails are sold at about 15¢ $\frac{1}{2}$ keg advance on the price of Iron Nails. Makers of Steel Nails are confident that they will be able to place their Nails on the market at as low figures as the best Iron Nails are sold before the fall season closes. An opinion prevails that, should the Steel Nail be sold at the same figure as the Iron Nail, the former will largely supersede the latter and make it almost unsaleable. Dealers object to it now on the ground that they do not wish to carry two stocks.

American Pig Iron.—The flurry of a week ago has passed off almost as suddenly as it came. The market for the past week was one of weakness and uncertainty, but no further reduction in prices has been noted. The fall in Southern Iron did not result in any increased demand, and, as stated by a prominent house, would not if the price were cut to \$10 or \$11 $\frac{1}{2}$ ton. The only advantage that can be achieved from further reduction in price will be in favor of speculation. Consumers are not buying beyond what they need and cannot be induced to take risks on the market until they feel that there will be a demand for their manufactured articles. The market, nevertheless, has suffered greatly from the shaking up of a week ago, and is in rather a demoralized condition. Nearly every furnace has set his own prices, and when these cannot be obtained he must "blow out" or pile up his Iron. The stringency of the money market and the several sharp lessons that banks have had on Iron collateral make it difficult to secure an advance, so there remains but one alternative, to "blow out." To this end everything seems to be moving, and observing consumers are cognizant of the fact. The probability of no Iron makers contracting a necessity, and for the week the demand was fairly active, consumers taking such brands as could be obtained at their respective bids. The Jackson Iron Company have again withdrawn from the market and instructed their agents that they positively will not accept less than \$21 $\frac{1}{2}$ ton, Chicago. There are other Charcoal Irons that can be had at from 50¢ to \$1 $\frac{1}{2}$ ton less, some of similar quality, while others are inferior. In placing their contracts, consumers at times show preference for furnaces that will be able to fill the contract under all conditions, and it is not infrequent that they pay 25¢ $\frac{1}{2}$ ton more for some special brand. For immediate delivery and carload buying the lowest man has the advantage in sales, and books the largest tonnage but shortest profits. Disregarding the circumstantial cause that produced lower figures last week, the following prices are quoted by the trade as bottom for carload lots, four months: Lake Superior Charcoal, Nos. 1, 2 and 3, at \$21 @ \$21.50; Nos. 4, 5, and 6 at \$22; Lake Superior Coke at \$20; Lake Superior and Ohio, mixed, at \$20 @ \$21; Ohio Standard Black Band, No. 1, \$21; Southern, No. 1, at \$18; No. 2 at \$16.50; Silvery Soft at \$17.50 @ \$19.50; Anthracite, No. 1, at \$21, and No. 2 at \$20; Bessemer Pig, \$18.75.

Scotch Pig.—The market for Scotch Iron has been more lively this week. Buyers have been more liberal in their orders and the demand stronger than for several weeks. We quote as follows: Summerlee, \$25.50, cash, from yard, and \$24.50 to arrive; Glengarock, \$25.50 from yard, and \$24 to arrive. **Merchant Steel.</b**

August 28, 1884.

THE IRON AGE.

1884.

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Trade Report.

General Hardware.

The amount of business done during this month has been below the expectations of the trade, and we hear much complaint on this score. Especially is there a disappointment in the matter of large orders, which are this year very backward. As compared with most other lines of business, however, hardware men have no special cause of complaint, as their condition is better than that of most other trades. The week since our last has been uneventful, and the changes in prices have been few and unimportant.

NAILS.

There is a fair demand for small lots, but orders for carloads are not very frequent. The ordinary trade moves along rather steadily, prices running about as they have been. Efforts to sell in greater quantity, however, result in the naming of lower figures, buyers taking advantage of any disposition on the part of sellers to force the market. The majority of sellers are, consequently, managing their transactions cautiously and endeavoring to adhere as closely as possible to natural conditions. The export trade keeps up pretty well and affords an outlet for a considerable quantity of Nails, which would otherwise press upon the market. Existing low prices are stimulating the movement of Nails abroad, the season having been much better in this respect than the corresponding season of last year. Inquiries for Steel Nails continue, and moderate sales are made, but the difference in price between them and Iron Nails, which is now 25 cents per kg or more, deters parties from ordering as freely as they would if prices were closer together. We continue to quote Iron Nails on a basis of \$2.30 @ \$2.35 for small lots from store in New York City, and \$2.25 for large lots.

BARB WIRE.

While the local trade is not at all brisk, there is a steady influx of small orders, with an occasional call for a carload or more. Very little demand from the West or Southwest is reported as yet, but the South is developing a little better business, and the export trade amounts to something considerable. An occasional order may be placed at a little lower rate than quotations, but sellers are usually endeavoring to secure the full price, insisting that they cannot make concessions without loss, owing to the firmness of the price of Plain Wire. It is reported that there is a very good prospect of the production of Barb Wire being curtailed involuntarily to some extent, the Washburn & Moen Manufacturing Company having applied for injunctions against several of the leading Barb Wire manufacturers, to restrain them from continuing operations until certain matters are decided. The curtailment of output just about the time that the fall trade is expected to commence would evidently stiffen prices. We continue to quote small lots of Galvanized Four-Point at 6 cents per pound and Painted at 5 cents; carload lots of Galvanized, 5½ cents, and Painted, 4½ cents.

We are in receipt of catalogues and price lists showing the extensive line of Farm Machinery, &c., manufactured by the George K. Oyler Manufacturing Company, St. Louis, Mo. Among the pamphlets is the catalogue for 1884-85, illustrating Buggies, Carriages and Spring Wagons made by the Springfield Buggy and Wagon Company, for whom the George K. Oyler Manufacturing Company are sole agents. Another catalogue is devoted to the exhibit of Sugar Cane Machinery, of which an extensive variety is shown. An edition of this list is also printed in Spanish. Among the other goods which are illustrated and described are the Excelsior Feed Mill, Corn Shellers, the Dexter Lock Lever Sulky, Hay Rake and Roll Cutters, Colter Blades and Hubs, to which special attention is directed, and the cut of which is shown on their advertisement on page 42. These manufacturers report trade for the first half of the year as having been satisfactory, but for the present rather light as compared with former years.

The Bindley Hardware Company, Pittsburgh, Pa., have issued, under date of August 1, discount sheet No. 3, applying to their catalogue, Vol. 2. With these they are also sending out supplementary pages to be inserted in their catalogue, exhibiting the variety of goods which they have added to their assortment since the issue of the volume. Among these we may mention Keystone Hollow-Ware, Gem Coat and Hat Hooks, the Ajax Boring Machine, Mathe's Burglar-Proof Safe Locks, Heller's Turning and Farriers' Hammers and Farriers' Pinchers, a line of Whips, Roller Skates and miscellaneous goods.

We have received from the Shepard Hardware Company, of Buffalo, N. Y., samples of the "Punch and Judy" and the "Humpty Dumpty" Toy Savings Banks. They are well finished in the striking colors usual in such goods, and are intended to retail at \$1 each. They are both 7½ inches high by 6 inches wide, and are made wholly of iron. They are amusing, and seem to have the elements of popularity.

The illustrated catalogue of Art Metal Work for Furniture Decoration and fine Cabinet Locks, just issued as Catalogue No. 27, by J. B. Shannon & Sons, 1020 Market street, Philadelphia, shows, in addition to those contained in previous catalogues, a

number of new goods lately added to meet the demands of the popular taste which has had so remarkable a development in this direction. While the regular line is sufficient to meet most requirements, the manufacturers are prepared to carry out special designs when furnished, and they make designs for the exclusive use of different furniture manufacturers. Charles E. Little, 59 Fulton street, is agent for these goods. Mr. Little has also secured the general agency for the Shipman Steam Engine, burning kerosene, of one man, 1 and 2 horse power, for running stationary machinery and small steam launches. He will mail circulars on application.

The "Correction Sheet No. 2," of the Francis T. Witte Hardware Company, 111 Chambers street, New York, gives the changes in prices since the publication of their net price list of 1883. They say: "Our quotations are strictly net; all rebates, as well as all trade and cash discounts, have been deducted. We do not sell 'culls' or 'seconds' unless specially so stated."

We print below extracts from a large number of letters received from manufacturers on the subject of cutting by jobbers of manufacturers' prices. While there is practical unanimity in admitting the evil, there is a wide difference of opinion as to its causes, and the proper remedy, if any is suggested. A very large proportion of the writers are persons who are very prominent in the trade and whose names would give great weight to what they say did we feel free to give them. We will give these extracts without further introduction, except that the first is from an extensive Western jobbing house, all the others being from manufacturers in many various lines of staple goods, as well as patented specialties:

The articles on "cutting prices" in yours of the 14th and 21st insts., from the standpoint of the manufacturer, throw the blame wholly on the jobber. We admit our share of the cutting, and our only excuse is competition. As suggestions for a remedy are invited, allow us to say that in our opinion one cause of the excessive competition is delivery by manufacturers to jobbers in distant cities free of freight. This delivery puts jobbers in all the principal cities on a par as to cost; consequently, they become competitors with each other all over the country. Suppose the manufacturer to sell f.o.b. at his railroad station, the freight to distant cities then becomes a protective tariff, and confines the jobber to the territory naturally tributary to his city. In this way competition, being confined to the jobbers of one city among themselves, would be more easily controlled than among jobbers of the whole country. These remarks apply more particularly to heavy goods, in which the most competition exists. We earnestly hope this discussion will result in much good to all concerned, but fear the only real remedy is the old one of experience, and that competition will increase until the ranks are thinned out by failures, and those who are left can then realize a living profit on their business.

It is and has been a conundrum to us ever since we commenced business, and we let the jobbers solve it. We guarantee our prices to them and advertise to the retail trade and consumers to create a demand. We have heard of so many ways of evading "combination" prices, "contracts," "rebates," &c., that we have never attempted to fix a selling price. The duration of a patent and life is too short to try and convince the jobbers that they can get decent prices on goods in which they have no competition on manufacturers.

We have had but very little trouble with jobbers cutting prices, except in one or two instances, and in those cases, as soon as we were assured of the fact, we promptly revised our discounts (to the cutters), so as to effectively put a stop to the practice. Fortunately, we are not wholly dependent upon the jobber for an outlet for our goods, and so could afford to take a stand that other manufacturers not so circumstanced might not deem advisable. While there are a great many jobbers in the Hardware trade that are honorable, square-dealing men, there are many others who seem to think that "a manufacturer has no right that a jobber is bound to respect," and seem bent upon "killing the goose that lays (for them) the golden egg," by forcing the manufacturer to cut loose from them entirely, and make a market for himself among the small dealers and even among the consumers, and it is evident to us that many manufacturers are beginning to see that their independence, if not their success, lies in that direction.

It is a very serious trouble, like others which are a fruitful source of, and cause also of, the fearful demoralization of prices in all kinds of goods. In a dull and declining market salesmen anxious for orders, ambitious to increase their trade, and more particularly new ones, depend more on shading prices than talking up quality or relying on the merits of their goods to secure trade. We know of no remedy for it. Jobbers will sell at whatever price they choose. One extreme follows another, and the intense competition will last until some get tired and lay down, while the survivors will be able to get more remunerative prices.

We think there is a tendency on the part of jobbers to desire to make too much profit on staple Hardware, and that they should be satisfied with about 10 per cent. above cost of goods after paying freight.

The article referred to, however, reflects our views and our experience pretty accurately. In common with other manufacturers we have suffered, are suffering, and suppose we shall continue to suffer, from the insane policy of the jobbers referred to. There are, of course, prudent, conservative men

among this class, but it is difficult for them to stem the tide and prevent the mischief done by their brethren who are so ambitious as to be at the bottom of the market, and who, as they phrase it, "will not be undersold." No jobber was ever the first to cut prices, so far as our observation goes. He is always and forever meeting some quotation that never was made. One source of the difficulty is the hot-headed, impulsive drummer, who goes out to sell goods at regular prices but at all hazards to sell goods, and who is always ready to meet prices without taking the trouble first to find out that they were really made. Then, of course, the shrewd country dealer must come in for his share of the blame in reporting quotations that were never made. This is, perhaps, as has been stated by others, the most serious part of the trouble. What gives point and force and momentum to it all is the quaking fear each jobber has that he is going to get left, and that some competitor will get away with his customers unless he is very generous with them. If there is anything in the above that has not been suggested a dozen times before, you are welcome to it. It would be more interesting reading, no doubt, if we were able to suggest a remedy. Won't some one of the thousands who are trying to fill the Patent Office with models and drawings of beneficial devices turn his attention for a little while this way? If he could hit the right thing in some happy moment, there would be "millions in it" for him.

The "cutting of prices" is an abomination, and only tends to bring prices to a lower level and continued complaints from jobbers to manufacturers that they cannot make profit enough on their goods, when the blame is all on the part of the jobbers. The manufacturer might furnish his goods to them at less than cost, and the result would still be the same.

Being manufacturers, and presumably, therefore, able to take a fair view from either standpoint, we would say that the difficulty complained of is one of those incidents which accompany a condition of trade like that which confronts us at present. It is only necessary to take a general view of things to become convinced that the matters alluded to are not limited to the Hardware trade, but extend themselves to the whole sphere of commercial activity. Cutting of prices and underselling are only special forms of the general tendency to make concessions in order to realize and keep things going, as the phrase is. The most of business houses feel better when they see activity around them—hands busily employed and goods moving, even when, as is too frequently the case, profits are very questionable. In dullness and apathy there is a sense of depression which it is very hard for active business men to bear. We do not presume here to make any remarks concerning what we may suppose to be the causes of the present condition of things, nor ought we to be considered as defending the disposition to make concessions unadmitted upon. The only point we wish to make is that certain conditions of trade have certain invariable accompaniments—bad times have bad accompaniments and good times good ones—and these conditions are certain to be reflected in the contemporaneous opinions of interested parties. Trade is like water; when it flows freely the impurities in it are not perceived, for they are carried off by the current; but when it is stagnant the bad elements all come to the surface and stay there, to offend the eye of the beholder.

There very much force in the view that you take in this matter, and it would be a very desirable thing, both to manufacturers and jobbers, if it could be remedied, but we are unable to suggest any remedy. We are of the opinion that any special discount given to jobbers they would feel at liberty to use as they see fit, and would not consent to any restrictions being placed upon them. We wish that we were able to suggest some practicable remedy for the difficulty.

We have received complaints from many quarters justifying all here charged. So far as we are concerned, we shall endeavor to protect our interests by having our salesmen visit the retailers direct. This seems the only recourse left us.

We do not sell our goods to jobbers. We have about 300 agents in all the principal cities and towns of the United States; they buy our goods at regular discounts, according to the business they do for us, and are obliged, under their contract with us, to always sell at the full price and never to give any discounts whatever. We hold our agents strictly to this contract, and if any of them are known to violate it we take the agency from them. We believe it is the best way to do our kind of business, and it works very satisfactorily to all concerned. When a purchaser knows that there is but one price, and that no one can buy any less, he is generally satisfied. The agents are generally satisfied, because they are sure of their commission. Our commissions are not large, and they do not need to be, because an agent always gets the full commission and never has to divide with a customer.

Your remarks in *The Iron Age* of 14th concerning the cutting of prices per the jobbers we think very opportune, and something that will bear repetition. As far as we are concerned, the jobbers have made prices for our goods for many years. Manufacturers in our line have (as in every other business) given those who buy largely a lower price than those who buy in small quantities, and, as far as our experience goes, the jobbers have universally used this extra price to obtain orders—dividing it with their customer, &c.

We have experienced considerable annoyance from the matter alluded to in your issue of the 14th inst., "cutting of prices by jobbers," who secure special discounts on large purchases. Our opinion is that this condition of things is largely due to the fact of the over-anxiety to do business, and the agencies employed to secure same. The

drumming system at the present age is one of the necessities of trade, but so many incompetent persons are employed for this purpose (in many instances simply because they can be employed at small salaries), who are devoid of experience and good judgment, without ability to comprehend the schemes resorted to by shrewd buyers to bear down prices to the very lowest notch, and so credulous that they believe every statement they hear, are easily influenced to overstep their instructions and yield a point or two in their discounts, even at the risk of the displeasure of their employers, who too often spend all their time in their offices or about their works, and never go down into the arena of trade, and are led to believe from the statements of these mushroom salesmen that the necessities of the case demanded the reduction. Our policy has always been never to give the cost of our goods to salesmen, except to old, tried and trusted ones, in whose judgment we have explicit confidence and who we know will not abuse their knowledge. We teach our salesmen it is their business to sell goods at a profit, and their value to us is not measured so much by the amount of goods they sell as by the profit their business yields. The most effectual remedy for this trouble is to radically change the method of many tradesmen who are unable to see that working without profits, less than the expenses of doing business, is suicidal to their interests.

While we deplore the cutting of prices, and with our brother manufacturers suffer greatly from the folly of merchants, we know of no relief for the manufacturer unless it be the extirpation of the entire jobbing trade, so-called. Our experience with this class of dealers has led us to look upon them as a piratical crew, living upon the legitimate profits of honest merchants. As a class, they care nothing for the manufacturer, and to accomplish this, and in order to get a small profit on the entire sale, they will sell some particular goods not only at less than manufacturers' prices, but at from 2½ to 5 per cent. less than they themselves pay for the goods. We ourselves do not care to deal with this class of "merchants," and will not give them prices nor sell them goods if we know their manner of doing business. If manufacturers would try to sell their goods direct to the legitimate dealers in the villages and towns, and ignore the jobbing trade, they would secure better prices for their goods, and, in the long run, do their selling with less expense to themselves.

Our experience is that the manufacturers have had more to do with low prices than the cutting of prices by the jobbers, and that there has been an increasing disposition on the part of the manufacturers of placing their goods, at least in our line of manufacture, directly in the hands of the users. By referring to the direct rates we notice discount on certain brands of goods at, say, 25 per cent., and at the same time the manufacturer will retail their goods at 45 and 50 per cent. discount. This has caused our branch of business to be very unsatisfactory. There is only money nowadays in articles that are made under patents and by special machinery.

The cutting of prices by jobbers is a very serious and annoying matter, but how can it be prevented and whose fault is it? While it is true that some over-anxious ones, desiring to show large sales and become known as "king" jobbers, sell goods at and below makers' prices, they are in a measure backed up by manufacturers whom they buy from, and the manufacturer is in a measure the prime cause of all the trouble. The manufacturer establishes his prices and sends out the salesmen to solicit orders from the jobbing trade generally; one after another is visited and sold to, in accordance with instructions. In due time Chicago, St. Louis or some other large trade center is reached, where an order of unusual size is presented and captured, but not until an additional discount is made. The jobber's price has been cut by the manufacturer because the order is a large one. The customer may not be so safe a party to sell to, and perhaps during the long run of one or more years may not buy as many goods of this particular manufacturer. But the large order filled the eye of the salesmen, and must be secured. So far it would not be very bad if the king jobber would only put this special extra discount in his pocket and keep it; but the example is set and is followed by the jobbers' salesmen for quantities that should pay a liberal margin. The small, or even large, jobber would not object, I am sure, to the special discount given the king jobber, did the k. j. only keep it; but he doesn't keep it, as we all know, and therefore the trouble. So long as the present state of affairs exists, the only remedy we can see is that of treating a buyer who buys in such quantities as to be generally rated as a jobber, and sells his goods in original packages to the retail dealers, to class him as a jobber, have one price for retailers and one for jobbers, and treat a jobber as a jobber, whether in Buffalo or Toledo, Cincinnati or Columbus, Chicago or Des Moines.

The extent of this evil is determined by the stress of competition between the manufacturers. Excessive competition makes the manufacturer helpless. He dreads losing a good customer, and will not, under such conditions, venture to dictate to the jobber at what price the latter shall sell his goods. The root of all the evils to which you have called attention in your journal is excessive competition. No manufacturer who is not driven to it by competition will allow freight to all over the United States, or will sell to syndicate buyers or will let his goods be sold by jobbers at prices lower than he sold to the jobber. No manufacturer will so truckle to the demands of his trade unless he is driven to it by competition. And the only remedy that we can see is for makers of established, recognized brands of goods to combine and make rules not only to determine the selling price of their goods by the manufacturers, but the selling price by the jobber. No one manufacturer can do this successfully unaided; he requires the cooperation of his competitors. The jobbers

will be thankful for such protection. It is not to be presumed that they desire a demoralized condition of things. The jobber only wants to feel assured that the manufacturer or combination of manufacturers who says to him, "Thus far shalt thou go, and no further," is powerful enough to enforce the rule equitably, and he will gladly and eagerly conform to it. Therefore, the only remedy we can suggest is such a union of manufacturers as will enable them to restrain the jobbers from unhealthy competition. We have known of cases where jobbers have asked for this kind of protection against themselves.

There has always been more or less conflict between the prices of makers and jobbers, and I suppose it has recently been intensified by the decreased volume of business offered and continual depreciations of values generally. The remedy for a very embarrassing condition of affairs lies in concerted action, which may restore the market to a more harmonious condition.

In regard to jobbers giving away special discounts, we know of but one remedy for it, and that is for manufacturers to stop giving special discounts, as the merchant has as much right to give away a portion of his profits to get trade as the manufacturer has; but if the merchant sells goods for less than a living profit, let the manufacturer, when he discovers it, stop selling to such merchants, and, when the merchant fails and cannot pay in full, compel him to go out of business, so that honest and honorable merchants can get a living profit.

So long as the manufacturer voluntarily puts it in the power of two or three large jobbers, by the giving of an extra 10 per cent. for quantity orders, to make a leader of his goods and demoralize his trade, he has little to grumble about, and experience works its own cure if he wants it cured.

Our experience is that jobbers undersell our regular trade prices. We have personal knowledge of several cases the past season where jobbers have sold some kinds of our goods at a gross profit to them varying from 5 to 10 per cent. Our experience also is that there are very few jobbers in the country to whom we could make a special price (we mean a price below our usual extreme price) without said jobber underselling the regular market price to the amount of the special we had given. There are, of course, exceptions to this rule, but the rule is that, if we make a special price for any reason that at the time being seems satisfactory to us, we hear within three or four weeks of said special price being "given away" by said jobber. The problem of the day with both manufacturer and jobber is, not how to sell goods, but how to sell them at a reasonable profit. The fact is, undoubtedly, that there are too many jobbers in the country and too many manufacturers, producing over-competition, and it seems to us that at present we are all going through a "survival of the fittest" process, and fair profits will not be obtained until some of us are "thinned out." It is easy to theorize that a jobber ought to get a good profit, but if the representative of a jobbing firm starts out on the road to sell, with his prices all arranged so they will pay his employers a fair profit, and the first customer he calls on (who perhaps has been a valued customer for a great many years) informs him that, while he wants a few goods, he can buy them at considerably less figures than those offered him by said salesman, the question is of course, What had said salesman better do? Pass the customer altogether or sell some goods at prices that do not pay a profit, and hope to retain said customer until a time comes that he can sell him some goods at a fair margin! We know from experience it is an easy matter for an employer to sit in an office and theorize that a salesman ought to sell goods at good profits. We also know from experience that it is an entirely different thing when a salesman calls on a customer and finds said customer is buying goods at much lower prices than he (the salesman) has been instructed to offer.

As to the injurious effect of the practice of jobbers in the giving away of their special discounts, thus cutting prices, and in many cases underselling the manufacturer to smaller dealers and consumers, there can be no doubt. The evil, no doubt, is growing. Our company have had occasion to realize this fact, and expect soon to take up the matter and consider it with a view of determining whether there is any, and, if any, what remedy. The subject will be found to widen as it is considered more carefully, and to have difficulties connected with it not easily solved or remedied. We shall await much interest the effect of your very proper criticism in the last *Iron Age*, and what, if any, action it may bring about by manufacturers.

I have read with much interest your article of the 14th in regard to the cutting of prices by the jobbing trade, and with your permission will submit a few ideas on this point: 1. I do not consider the question of the publication of discounts by *The Iron Age* as one which admits of discussion. They must publish these prices or give up any claim as a trade journal. With published prices by nearly every manufacturer in the country, a complaint of such publication in a condensed form by *The Iron Age* is puerile and worthy of no consideration. 2. The jobbers themselves demand these prices in print. Acting on the suggestion of the jobbers, some manufacturers have made an endeavor to discontinue all lists and discounts and make sales at net prices, but it has been found almost impossible to do this on account of the demand of the jobbers themselves. "We must have a guide," they say; "we cannot be bothered with making out net prices." And it follows that if there is a printed list there must be a printed discount, especially as the custom of large lists and heavy discounts has greatly increased of late. 3. With a special price to jobbers there always has been and always will be "cutting" by jobbers, as there never has and never can be any uniformity in this "special." It is by no means confined to

the very large jobbers. The manufacturer usually makes a quantity discount too large for the ordinary jobber, while he dare not make it large enough for the few "great big men." Result, the small jobber, overbuys to reach the quantity and quickly unloads his surplus at a "cut price." The large jobber is just as anxious and is usually just as successful in beating the quantity price as the small jobber in reaching the quantity price. He very quickly "runs against" the quantity price, or very near it, quoted by the small jobber, and promptly makes his regular jobbing price at this figure and puts the screws to the manufacturer for another "advantage." It is as impossible to prevent this as it is to make all men alike. Large purchases and cash payments will always get a concession from anxious and impetuous sellers, and the responsible and shrewd manufacturer will avoid or use the "chronic cutter" as may best suit his purpose.

We believe you can do no better service both to manufacturers and to the jobbing trade, particularly the latter, than to promote a full discussion of the subject of the giving away of special discounts by jobbers. This evil has grown largely of late years and has become a serious question to nearly all large manufacturers. A persistence in their present course on the part of the jobbers will undoubtedly compel manufacturers to seek more and more direct relations with the retail trade, and compel them also to reduce the special discounts now allowed to jobbers. The effect will thus be detrimental to the interests of the latter in a two-fold manner. In selling to a jobber at lower prices a manufacturer concedes to him a portion of his profits in return for an expected benefit in the extension of his trade. If, however, the jobbers efforts result merely in taking from the manufacturer trade which he already controls, he obtains no increase in his business and loses a material portion of his profits. The true policy of the jobber, therefore, is to make himself so useful, not merely to the retail dealer, but also to the manufacturer, that neither can dispense with him. To accomplish this as affecting the manufacturer he must succeed in extending the business of the latter beyond the limits it will otherwise attain, and to be permanently successful in this he must abstain in great part, if not wholly, from any giving away of his own commissions (allowed usually in the form of extra discounts) to his retail customers. It is our prediction that the present policy of the jobbing houses, if persisted in, will lead ultimately to an entire withdrawal from them of all business on the part of the larger manufacturers. I do not believe that such is the desire of the latter, but fear that this course will be forced upon them in self-protection unless the present policy of the jobbing trade is materially changed.

It has got to be a common practice with the jobbers to give away their specials and then complain to the manufacturers that they cannot make anything on their goods. Thus it works both ways, and as a consequence a still further concession is made, until the jobber has completely ruined the trade both for himself and the manufacturers, and it is fast working to a point where they will compel the manufacturers to ignore the jobber and go direct to the small trade and consumer. We see this fast working in our branch.

There was nothing in general of this nature that has come to our knowledge. There may be instances of this kind and of our goods being made a "leader," but don't think it in any way general, or so much so as in any way to demoralize prices. We should refuse to sell those whom we knew were practicing this and were not sustaining our prices in market.

We are fully aware that all you said was fact, and we are surprised that any house should do their business on a margin of 5 per cent. and less, and yet it is done, as we know of many instances where our goods have been sold within 5 per cent. of their purchase. Your article covers the ground and has our approval. There is a remedy, but the jobbers themselves must apply it. If they do not, the day will come when all the trade will have passed out of their hands and into the hands of the manufacturers, and the trade that knew the jobbers will know them no more forever. That remedy is simply this: The jobber must not sell below the published price of the manufacturer.

We very much approve of your article on "cutting prices." The jobbers, instead of bearing prices and competing with and slandering manufacturers, should co-operate with them to promote the mutual interests of both, for the manufacturers desire to give their undivided attention to manufacturing, and to let the jobbers attend to the mercantile part of it. Should a manufacturer undertake to sell a dealer located within reach of his jobber he probably will find that he will be undersold by the jobber on his own goods, and possibly the jobber may claim a rebate on these very goods. It is to the interest of the dealer to maintain fair prices and to avoid frequent changes in prices, while the jobber acts as though it would prove best for him to break prices. Would it not be best for manufacturers to cultivate trade direct with the dealers.

The case is correctly stated in that article in regard to the "cutting of prices," and is an evil of which manufacturers have just reason for complaint, and have for a long time in vain sought a remedy. There is no practical way of controlling the jobber that we know of. When they purchase the goods they claim a right to dispose of them at their pleasure. We despair of finding a remedy for the evil, which will only cease when the demand is fully up to the means of production, and with the continual increase of the means we think that time will arrive about the time of the millennium.

As far as the writer is concerned, he can see no reason why the bottom prices should

not be published, as the jobbers seem determined to commit suicide any way.

We never give any special discounts to any one; we make but one price on our goods, and if the trade sell them at cost we have never as yet discovered any way to rectify it. We think, to-day, that prices are more demoralized than we ever saw them.

The policy to be pursued and the policy pursued are two different things, even with the theorist. It always has been and probably always will be a fact that the more a man buys the better quotation he will receive. This, taken in one view, is the correct principle, as it costs less to sell the same quantity of goods, but in the end it works harm to the balance of the trade. What we consider the correct principle is that the legitimate wholesale trade should receive the same discount. We don't wish you to infer by this that that is our practice, for the reason that our prices are governed by competition, but one can readily see that the principle is right, but the temptation being so strong to shade prices for large orders that a correct principle, as we see it, will not come into general use. We think that the whole trouble lies with the manufacturers, and while other manufacturers have tried to enforce the selling price for the wholesaler, it has been a signal failure. We will say, though, that while we never have made any pretensions to hold the jobber to a fixed price, we have sacrificed a large amount of trade to keep our prices steady in the market, and it has become known among the trade that we will not allow our goods to be used as a leader.

It is with pleasure we note the remarks you print in *The Iron Age* of the 14th inst., and we coincide in every particular. The tendency of jobbers to make inroads on prices, and also their utter disregard to merit of an article, have long since been a bane to manufacturers. The jobber holds a position to introduce and sell the wares of a manufacturer, generally distant from the factory, and they are supposed to receive a given amount below market rates for their labor. Now we have never discovered a jobbing house that will take any notice of a new invention, an improvement or any special new feature, and try to sell it or even deign to notice it. Yet, let the manufacturer introduce, spend capital by employing a special salesman, advertise and get a demand for his work, then the jobbers all sing out for the goods and demand an extra 10 per cent. for their work. All manufacturers will feel the truthfulness of that assertion. Now, all retailers prefer buying from houses that they can obtain all manner of goods from, and this fact, coupled with the others, have often led us to think that a Hardware Exchange in each large city, governed by the manufacturers, would be the only way to abolish this system of jobbing, and would get the manufacturers nearer to the trade than any method we know of. Say that a Hardware Exchange was organized in your city, with competent managers and salesmen, and manufacturers could have their goods represented and new ideas introduced, the prices could be kept on a rock bottom and a better class of goods could be sold, and it would not cost the parties over 10 per cent. to have these great advantages. We have often thought over this thing, and merely make this as our idea of getting the manufacturers nearer to the heart of trade, and placing things on a solid foundation and offering excellent means for the introduction of many a valuable and worthy article which is otherwise hidden from view.

If manufacturers will protect themselves with rebate to jobbers handling their goods I can see how nicely they have the jobber in hand and how quick their actions can be brought to light. Of course you understand my meaning; consequently, I will not explain, and sooner or later every manufacturer in the United States will adopt this manner of protecting themselves.

Structural and Shaped Iron.—No improvement is reported in this line, the bricklayers' strike still interfering very considerably with deliveries of material contracted for. For small lots quotations are as follows: Angles, from store, 2.4¢ @ 2.6¢; Beams, from store, 2.9¢ @ 3¢; Beams and Channels, on dock, 3.5¢.

Plate Iron.—A moderate business is being done in Tank Iron, and there is some demand for Plates for such purposes as girders, bridges, &c., but orders are small, ranging from 5 to 50 tons. Quotations are nominally as follows: Common or Tank, 2½¢; Refined, 2½¢; Shell, 2½¢; Flange, 3½¢; Extra Flange, 4½¢ @ 5¢.

Sheet Iron.—Business in this line has been temporarily quiet, in marked contrast with the weeks immediately preceding. It is expected to pick up again shortly, however. For prices see our list of New York Wholesale Prices.

Steel Rails.—The most important sale of the week was one of 10,000 tons, for delivery at East St. Louis, at \$1, delivered. This sale was made by a Pennsylvania establishment, whose rate of freight to that point is estimated to be from \$4 to \$4.50 per ton, thus netting from \$26.50 to \$27. Other sales were made in various lots, possibly aggregating 10,000 tons more, at about \$27 per ton. Inquiries are still numerous, and negotiations are being conducted for further lots which will doubtless be concluded within a few days. Some heavy transactions are evidently about taking place, and those Rail companies which are anxious to secure work regardless of prices ought to be able soon to obtain enough orders to keep them busy through the winter.

Merchant Steel.—There is no animation in this line. Business is very quiet and prices show no change. We quote: American Tool Steel, 10¢, with a concession to large buyers; Crucible Machinery, 5½¢; Open-Hearth Machinery, 3½¢ @ 3½¢; Bessemer Machinery, 3¢; Tank Steel, 3½¢ @ 4¢; Boiler Plates, 4½¢ @ 5½¢; English Tool, 14½¢ @ 15½¢.

American Pig Iron.—The demand still continues to be of small proportions. The sales of the week, as far as can be ascertained, were less in the aggregate than those

of the previous week. While no indications are visible of an early improvement in the demand, deliveries are still going forward on old contracts, to an extent that taxes the present production of the principal companies represented in this market, as they now have a number of their furnaces out of blast. The supply of standard No. 1 X Foundry Iron is exceedingly limited, some buyers being unable to secure needed supplies of the brands they wish to use. Other brands, however, can be had without difficulty, though the supply of outside Irons has been decreased by the recent rise in freights, which now prevents some of the Ohio Irons from coming into this section that had secured quite a foothold. Stocks of Pig Iron in the Lehigh Valley are reported to be quite light. Producers are hopeful of an improved demand before very long, as consumers are also poorly supplied with stocks. If the latter should for any reason desire to stock up to even a limited extent, they would soon absorb the small quantity now on the Lehigh. But this has been the condition of affairs for several months, and it may continue for months longer. Quotations for standard Lehigh brands are still as follows, tidewater delivery: No. 1 X Foundry, \$20 @ \$20.50; No. 2 X Foundry, \$18.50 @ \$19; Gray Forge, \$17.50 @ \$18. Outside brands, \$1 @ \$2 cheaper.

Scotch Pig.—The arrivals last week were a little larger than usual, aggregating about 1200 tons. Some of this was stored, and a little was sold from dock, but most of it had been sold previous to arrival here. A better feeling has developed in this branch of trade, owing to more inquiry for quite a number of brands, but actual sales have been very little more than usual. The advance in prices on the other side of the Atlantic has evidently spurred up buyers here to a slight extent. Thus far there has been very little change in prices in this city, which are about as follows, dock lots being, of course, available occasionally at concessions: Gartsherrie, \$21 to arrive, \$22 from yard; Shotts, \$21.50 @ \$21.75 to arrive, \$22 from yard; Langloan, \$21.50 to arrive, \$22 from yard; Carnbroe and Glenarnock, \$20.50 to arrive, \$21.50 from yard; Coltness, \$22 to arrive; Summerlee, \$20.75 @ \$21 to arrive; Dalmellington, \$20 to arrive; Eglinton, \$19.25 @ \$19.50 to arrive; Clyde, \$20 to arrive.

Bessemer Pig and Spiegeleisen.—For Foreign Bessemer nominal quotations are still \$10 @ \$10.50, with no inquiries reported. A small sale of 30% Spiegeleisen was made on private terms. Quotations of 20% are nominally \$27.50 @ \$28, but on some brands the lower figure would doubtless be shaded. For 30% the usual asking price is from \$31.50 to \$32.

Bar Iron.—The demand for mill lots is light, but inquiries are in the market which may develop considerable business. The manufacturers of railings, fire-escapes and similar work appear to be the principal consumers of Bar Iron just now, a great deal of Common Iron being used in that way. Store trade continues very quiet. We continue to quote: Best Refined, at mill, 1.75¢ @ 2¢; from store, 2.1¢ @ 2.25¢; Common Iron, at mill, 1.55¢ @ 1.7¢; from store, 2¢ @ 2.1¢. Store prices are not firmly maintained, concessions being frequent.

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Scrap Iron.—No business is reported for the week. Nominal quotations are \$19.50 @ \$20 for No. 1 Wrought from yard, with the tendency in buyers' favor.

Metal Exchange.

We are reported the following sales as having occurred on the floor of the Exchange since those mentioned in our last issue:

WEDNESDAY, August 20.—Second Call.

10 tons Tin, Aug. 10,182

FRIDAY, August 22.

10 tons Straits Tin, Aug. 182

10 " " Sept. 182

WEDNESDAY, August 27.—First Call.

10 tons Tin, Aug. 1815

10 " " 1815

RE-EXPORT.

Total 93,884

Re-export. 1,073

Net totals 91,911

This trade was distributed as follows, in thousands of taels:

	Import 1881.	Export 1881.	Import 1882.	Export 1882.
England	23,738	22,731	18,759	22,309
Hong Kong	31,190	17,661	29,063	16,488
British India	26,819	494	18,264	477
Straits and Australia	1,780	3,472	1,565	1,027
United States	3,300	10,223	3,377	8,120
Continent of Europe, without Russia	2,473	9,806	2,484	8,752
Russia via Odessa	1,030	9	9	946
Russia via Siberia through Khabar-	113	8,523	3,286
Japan	8,788	1,764	4,442	1,767
Other countries	689	750	1,644	3,865
Total	93,884	71,453	79,504	67,387
Re-export	1,073	1,789
Net totals	91,911	71,453	77,715	67,387

American trade with China and Hong Kong for the calendar year 1883 shows the following:

	Domestic export.	Foreign export.	Import.
To China	\$4,417,052	\$448	\$18,566,566
To Hong Kong	3,395,648	11,325	9,306,873
Total	\$7,802,690	\$12,073	\$22,866,439
Total trade	\$90,180,192

This is an increase of some \$2,0



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Our genuine wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing for the bar. These improvements, in combination with our new ferrule, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest wrench in the market. None genuine unless stamped.

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BURROUGH BROS., Kansas City, Mo.
THE TODD-DONIGAN IRON CO., Louisville, Ky.
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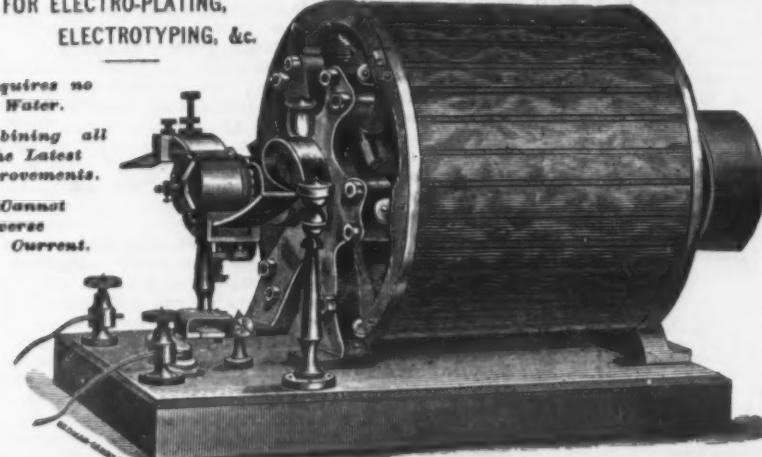
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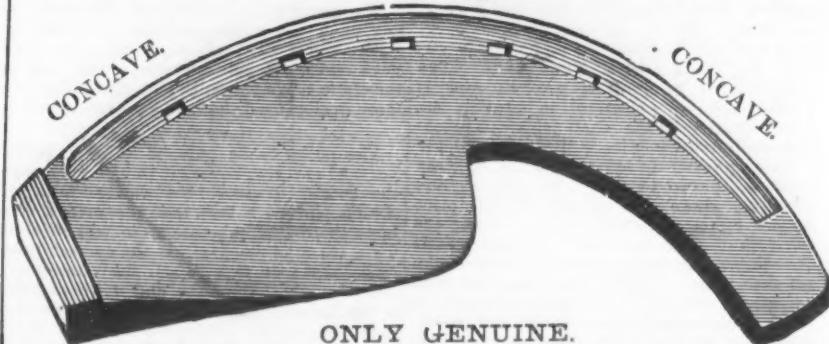
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ONLY GENUINE.

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The Parker and Colburn Patents cover broadly the dies in which the shoes are forged. We are the only licensees, and all parties are cautioned against using either of the dies or the forging mechanism or processes so protected, as our rights under said patents will be fully maintained.

While we can furnish either the Concave Shoe with One Calk, or the Flat Shoe with Two Calks, we emphatically recommend the Concave, with one Calk, for the following reasons, viz:

First.—Because the entire bearing of the shoe should come upon the shell of the hoof, and not upon the ball or tender part of the foot, as is necessarily the case with the flat shoe. This principle is recognized by all experts in the shoeing both of oxen and horses, and will prevent a tendency to sore foot.

Second.—Because by having one calk only, the shoe can be cut off or lengthened and fitted more perfectly to the foot.

Third.—Because by having one calk only, the shoer can make the other calk at any angle he desires.

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" 4, " " 6 1/2 " " 5 "

Packed in boxes or kegs of 100 pounds, half each rights and lefts. Full weight, and no charge for packages.

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MANUFACTURERS OF

Hardware Specialties,

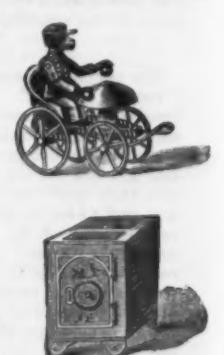
IRON TOYS AND NOVELTIES.

MAIN OFFICE AND FACTORY:

FRANKFORD, PHILA.

Phila. Sample Office, 415 Commerce Street, New York Branch Office, 128 Chambers Street, Bramhall & Spier, Mgrs.

Send for Catalogue.



PURE TURKISH EMERY.

WALPOLE EMERY MILLS,
South Walpole, Mass.

Wholesale Hardware Prices, August 27, 1884.

HARDWARE.

Packing Steam.	dis 20%
Peach Parers.	dis 15, dis 10%
Rotary Knife.	dis 15, dis 10%
Diamond State.	dis 15
Pencils.	high list, dis 50%
Faber's Carpenters' Pencil.	dis 50, dis 25 net
Dixon's Lead.	dis 44, dis 25 net
Dixon's Lumber.	dis 75, dis 50 net
Dixon's Carpenter's Pencil.	dis 40, dis 10%
Ruler, 5 to 6 in.	dis 11, dis 6 to 7, dis 12
Adze Eye, 5 to 6 in.	dis 12, dis 10%
Picture Nails.	dis 50, dis 10%
Brass Head, Sargent's list.	dis 50, dis 10%
Brass Head, Mfg. Co.	dis 50, dis 10%
Porcelain Head, Sargent's list.	dis 50, dis 10%
Porcelain Head, Judd's list.	dis 33, dis 10%
Porcelain Head, T. & S. Mfg. Co.	dis 33, dis 10%
Niles' Patent.	dis 33, dis 10%
Pinking Irons.	dis 75, dis 10%
Plane and Plane Irons.	dis 20%
Bench, First Quality.	dis 25
Bench, Second Quality.	dis 15
Molding.	dis 15
Bailey's (Stanley R. & L. Co.) The Stanley (S. R. & L. Co.)	dis 20 & 10%
Bailey's (Stanley R. & L. Co.) The Stanley (S. R. & L. Co.)	dis 20 & 10%
Plane Irons, Butcher's.	dis 50 to 2
Plane Irons, Buck Bros.	dis 50 to 2
Plane Irons, Auburn Tool Co.	dis 20 & 10%
Plane Irons, The Globe Mfg. Co.	dis 20 & 10%
L. & J. White.	dis 20
Plane Irons, Ohio Tool Co.	dis 20 & 10%
Plane Irons, Sandusky Tool Co.	dis 20 & 10%
Pliers and Nippers.	dis 33, dis 10%
Hall's Pat. Compound Lever Cutting Nippers, No. 2.	dis 20 & 10%
Humason & Beckley Mfg. Co.	dis 30 & 10%
Gas Pliers.	dis 40
Enders and Nipper.	dis 25
Russell's Parallel.	dis 50
P. S. & W. Cast Steel.	dis 50
P. S. & W. Tinner's Cutting Nippers.	add 5%
Plumbs and Levels.	dis 33, dis 10%
Diston's.	dis 45, dis 10%
Stanley R. & L. Co.'s Fair Adjustable.	dis 65, dis 10%
Stanley R. & L. Co.'s Non-Adjustable.	dis 65, dis 10%
Chapin's Patent Adjustable.	dis 65, dis 10%
Chapin's Non-Adjustable.	dis 65, dis 10%
Standard Rule, No. New Adjustable.	dis 65, dis 10%
Stanley R. & L. Co.'s Non-Adjustable.	dis 65, dis 10%
Johnson's Patent Adjustable.	dis 65, dis 10%
Pocket Levels.	dis 65, dis 10%
Dav's Inclinometers.	dis 20
Post Hole and Tree Augers.	dis 33, dis 10%
Samson Post Hole Digger.	dis 30, dis 10%
Post Hole Augers.	dis 30, dis 10%
Eureka Diggers.	dis 25
Leed's.	dis 40
Vaughan's Hollow Tube Hole—6 in., \$23.00; 7, 8 and 9 in., \$25.00	dis 20 & 10%
Keller's Little Auger.	dis 20
Pruner Hook and Shears.	dis 18,00
Diston's Combined Pruning Hook and Saw.	dis 20 & 10%
Diston's Pruning Hook.	dis 20 & 10%
E. S. Lee & Co.'s Pruner.	dis 20 & 10%
Pruner Shears.	dis 10,00 to \$4.75 net
Henry's Pruning Shears.	dis 20 & 10%
Wheeler, M. & Co.'s Combination.	dis 12, dis 10%
Dunlap's Saw and Chisel.	dis 40
Pulleys.	dis 10,00 to \$15.00
Hot House and Tack.	dis 65,00 to 10,00
Japaned Screw.	dis 65,00 to 10,00
Japaned Slide.	dis 65,00 to 10,00
Japaned Clothes Line.	dis 65,00 to 10,00
Hay Fork, Solid Eye, 44, 50.	dis 75,00 to 10,00
Hay Fork, "F" Common and Pat. Bushed.	dis 20
Hay Fork, "F" Common and Pat. Bushed.	dis 20
Hay Fork, Tarbox Pat. Iron.	dis 20
Hay Fork, Tarbox Pat. Iron.	dis 20
Shade Rack.	dis 45
Pumps.	dis
Cistern.	dis
Pitched Sheet.	dis
Wood and Steel Length.	dis
Punches.	dis
Saddlers' or Drive.	dis \$2.00; 2.25, 2.50, dis 55
Benns' & Call Co.'s Cast Steel Drive.	dis 50 & 10%
Benns' & Call Co.'s Springfield Socket.	dis 50 & 10%
Spring.	dis 75,00 to 10,00
Spring Length, Patterned.	dis 15
Benns' & Call Co.'s Spring and Check.	dis 40
Crawford's Adjustable.	dis 30
Sold Tinnings.	dis 14, dis 40 to 10
Rail.	dis
R. Sliding Door, Wrought Brass, 7' 35, dis 20.	dis 75
Sliding Door, Bronze Part. Iron, 7' 10" foot, dis 35.	dis 75
Sliding Door, Iron, Painted, 7' 10" foot, dis 20 & 10.	dis 75
Barrel Door, Light, 12' 10" x 3' 10" x 4' 10" dis 10.	dis 100
B. D. for 100 feet.	dis 25
R. H. for 100 feet.	dis 25
Small, Med. Large.	dis 25
Per 100 feet.	dis 25
Terry's Wrought Iron, 5¢ per foot.	dis 25
Rakes.	dis 60
Cast Steel.	dis 60
Malleable.	dis 60
Hay.	dis 40
Razors.	dis 20
J. T. T. Razor Co.	dis 20
Westerholme & Butcher.	dis 10 to 4, dis 10
Razor Strops.	dis 45
Genuine Emerson.	dis 45 to 50
Badger's (not Emerson).	dis 33 to 40
Imitation Emerson.	dis 20
Torrey's.	dis 20
Refrigerators.	dis 30 to 33, dis 10
Grace & Co.	dis 33, dis 10
Challenge.	dis 25
Challenge Beer Coolers.	dis 25
Rivets.	dis
Black Iron and Tinned.	dis
Iron in bulk.	dis
Iron Casting.	dis
Black Iron Rivets and Burrs.	dis 40
Copper Rivets and Burrs.	dis 50
Nos. 7 8 9 10 11 12 13 14 15 \$ 4.90 50¢ 52¢ 54¢ 56¢ 58¢ 60¢ 65¢ 70¢	dis 40 to 10
Rivet Sets.	dis
Rods—Star, Brass.	dis 50 to 100
Star Black Walnut.	dis 50 to 100
Rollers.—Barrel Door, Sargent's list.	dis 60 & 10%
Acme (Anti-Friction).	dis
Rope—Mfr's list, Aug. 7, 1884.	dis 12, dis 10
Manila.	1/4 inch and larger, dis 12, dis 10
Manila.	1/4 and 5/16 inch, dis 17, dis 10
Manila Tarred Rope.	1/4 and 5/16 inch, dis 17, dis 10
Manila Hay Rope.	1/4 and 5/16 inch, dis 17, dis 10
Sisal.	1/4 inch and larger, dis 12, dis 10
Sisal.	1/4 and 5/16 inch, dis 17, dis 10
Sisal, Hay Rope.	1/4 and 5/16 inch, dis 17, dis 10
Sheave.	dis
Sliding Door, M. W. & Co., list.	dis 50 & 104,2
Sliding Door, R. & E. list.	dis 60 & 104,2
Sliding Door, Patent Roller, Hattfield's.	dis 60 & 104,2
Sliding Door, Russell's Anti-Friction.	dis 60 & 104,2
Sliding Door, Moore's Anti-Friction.	dis 60
Sliding Shutter, R. & E. list.	dis 50 & 104,2
Sliding Shutter, Patent.	dis 60 & 104,2
Sliding Shutter, Heading list.	dis 60 & 104,2
Moore's Anti-Friction (Hanging).	New list, dis 25
Ship Tools.	dis
L. & J. W. White.	dis 204,5
Shovel and Spades.	dis
Ames' Shovels, Spades and Scoops.	dis 17, dis 10
Gritth's.	dis 50 & 10
Colony.	dis 15
Groom Shovel Co.	dis 20
Hannan & Co.	dis 20
Leigh Mfg. Co.	dis 20
Patterson & Co.	dis 20
Payne Pettebone & Son, list Jan. 2, 1882.	dis 50 & 10
R. T. Pettebone, Pat. Shovels, new list.	dis 50
R. T. Pettebone, Pat. Scoops, new list.	dis 30
Shovel and Spade Co. (Patent).	dis 20
Sliding Shutter, Heading list.	dis 60 & 104,2
Ship Tools.	dis
Lester, \$10.00.	dis 25
Rogers, \$5.00.	dis 25
Scythes.	dis 25
Shears and Scissors.	dis
American (Cast) Iron.	dis 75
Pruning.	See Pruning Hooks and Scissors
Barns' & Lamp Trimmers.	dis 10
Tinner's.	add 6 to 10
Seymour's, List, Dec., 1881.	dis 60
Heimlich's, List, Dec., 1881.	dis 60
Leinisch's, Tailor's Scissors.	dis 50
Mac Cuttell Co. St. Trimmers.	dis 50
Cast Steel Trimmers.	dis 50
Wiss, J., & Sons' List, Dec., 1881.	dis 60
Wiss, J., & Sons' Tailors' Shears.	dis 50
Shears.	dis
Sliding Door, M. W. & Co., list.	dis 50 & 104,2
Sliding Door, R. & E. list.	dis 60 & 104,2
Sliding Door, Patent Roller, Hattfield's.	dis 60 & 104,2
Sliding Door, Russell's Anti-Friction.	dis 60 & 104,2
Sliding Door, Moore's Anti-Friction.	dis 60
Sliding Shutter, R. & E. list.	dis 50 & 104,2
Sliding Shutter, Patent.	dis 60 & 104,2
Sliding Shutter, Heading list.	dis 60 & 104,2
Moore's Anti-Friction (Hanging).	New list, dis 25
Ship Tools.	dis
Lester, \$10.00.	dis 25
Rogers, \$5.00.	dis 25
Scythes.	dis 25
Shears and Scissors.	dis
American (Cast) Iron.	dis 75
Pruning.	See Pruning Hooks and Scissors
Barns' & Lamp Trimmers.	dis 10
Tinner's.	add 6 to 10
Seymour's, List, Dec., 1881.	dis 60
Heimlich's, List, Dec., 1881.	dis 60
Leinisch's, Tailor's Scissors.	dis 50
Mac Cuttell Co. St. Trimmers.	dis 50
Cast Steel Trimmers.	dis 50
Wiss, J., & Sons' List, Dec., 1881.	dis 60
Wiss, J., & Sons' Tailors' Shears.	dis 50
Sheaves.	dis
Sliding Door, M. W. & Co., list.	dis 50 & 104,2
Sliding Door, R. & E. list.	dis 60 & 104,2
Sliding Door, Patent Roller, Hattfield's.	dis 60 & 104,2
Sliding Door, Russell's Anti-Friction.	dis 60 & 104,2
Sliding Door, Moore's Anti-Friction.	dis 60
Sliding Shutter, R. & E. list.	dis 50 & 104,2
Sliding Shutter, Patent.	dis 60 & 104,2
Sliding Shutter, Heading list.	dis 60 & 104,2
Moore's Anti-Friction (Hanging).	New list, dis 25
Sheave and Spades.	dis
Ames' Shovels, Spades and Scoops.	dis 17, dis 10
Gritth's.	dis 50 & 10
Colony.	dis 15
Groom Shovel Co.	dis 20
Hannan & Co.	dis 20
Leigh Mfg. Co.	dis 20
Patterson & Co.	dis 20
Payne Pettebone & Son, list Jan. 2, 1882.	dis 50 & 10
R. T. Pettebone, Pat. Shovels, new list.	dis 50
R. T. Pettebone, Pat. Scoops, new list.	dis 30
Shovel and Spade Co. (Patent).	dis 20
Sliding Shutter, Heading list.	dis 60 & 104,2
Ship Tools.	dis
Lester, \$10.00.	dis 25
Rogers, \$5.00.	dis 25
Scythes.	dis 25
Shears and Scissors.	dis
American (Cast) Iron.	dis 75
Pruning.	See Pruning Hooks and Scissors
Barns' & Lamp Trimmers.	dis 10
Tinner's.	add 6 to 10
Seymour's, List, Dec., 1881.	dis 60
Heimlich's, List, Dec., 1881.	dis 60
Leinisch's, Tailor's Scissors.	dis 50
Mac Cuttell Co. St. Trimmers.	dis 50
Cast Steel Trimmers.	dis 50
Wiss, J., & Sons' List, Dec., 1881.	dis 60
Wiss, J., & Sons' Tailors' Shears.	dis 50
Sheaves.	dis
Sliding Door, M. W. & Co., list.	dis 50 & 104,2
Sliding Door, R. & E. list.	dis 60 & 104,2
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Sliding Door, Moore's Anti-Friction.	dis 60
Sliding Shutter, R. & E. list.	dis 50 & 104,2
Sliding Shutter, Patent.	dis 60 & 104,2
Sliding Shutter, Heading list.	dis 60 & 104,2
Moore's Anti-Friction (Hanging).	New list, dis 25
Ship Tools.	dis
Lester, \$10.00.	dis 25
Rogers, \$5.00.	dis 25
Scythes.	dis 25

WHOLESALE METAL PRICES, August 27, 1884.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-12¢ per lb.; provided that no Bar Iron shall pay a less rate of duty than 35¢. Sheet, 11-12¢ to 15-16¢ per lb.; Band, Hoop, and Scroll, 16 to 17¢ per lb.; Railroad Bars weighing more than 25 lb. per yard, 7-10¢ per lb.

Standard American Pig Iron.

Foundry No. 1 X. \$30.00 @ 20.50
Foundry No. 2 X. 18.50 @ 19.00
Gray Forge. 17.50 @ 18.00

No. 1 Scotch Pig Iron.

Cambroo. 20.50 @ 21.50
Coltness. 22.00
Shotts. 21.50 @ 22.00
Glengarnock. 20.50 @ 21.50
Gartsherrrie. 21.00 @ 22.00
Langloan. 21.50 @ 21.00
Suimerlee. 20.75 @ 21.00
Dalmellington. 20.00 @ 21.00
Eglinton. 19.25 @ 19.50
Clyde. 20.00

Rails.

Steel, at Eastern mills. 27.00 @ 28.00
Old Raila. 18.00 @ 18.25

Scrap.

Wrought, per ton, from yard. 19.50 @ 20.00

Bar Iron from Store.

Common Iron:
1 to 1 in. round and square. 2.10¢
1 to 6 in. x 3 to 1 in. 2.10¢

Refined Iron:
1 to 2 in. round and square. 2.10¢ @ 2.25¢
1 to 6 in. x 3 to 1 in. 2.20¢ @ 2.45¢

Rods—1 and 11-12 in. No. 12. 2.90¢ @ 3.25¢
Bands—1 to 6x3-10 in. No. 12. 2.50¢ @ 2.60¢

"Burden's Best" Iron, base price. 2.50¢

Burden's H. B. & S. Iron, base price. 2.50¢

Norway Nail Rods. 1.4¢ @ 1.6¢

Sheet Iron from Store.

Common R. G.
American. Cleanned.
Nos. 10 to 16. 2.70 @ 3.00
17 to 20. 3.25 @ 3.125¢
21 to 24. 3.50 @ 3.75
25 and 26. 4.00 @ 4.25
27. 4.50 @ 4.75
28. 5.00 @ 5.25
Galvanized, 10 to 20. 5.00 @ 5.50
Galvanized, 21 to 24. 5.50 @ 6.00
Galvanized, 25 to 30. 6.00 @ 6.50
Galvanized, 27. 6.50 @ 7.00
Galvanized, 28. 7.00 @ 7.50
American Russia. 10.00 @ 10.50
Russia. 11.00 @ 11.50
American Cold Rolled. 12.00 @ 12.50

Iron Wire. See Wire.

STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb. or less, 45¢ ad. val.; valued above 4¢ and not above 7¢ per lb., 25¢ per lb.; valued above 7¢ and not above 10¢ per lb., 34¢ per lb.; Extra—Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 1.4¢ per lb. in addition to above; Steel Circular Saw Plates, 1¢ per lb. addition to the above.

American Cast Steel.

For American Steel, see Pittsburgh quotations.

English Steel.

Best Cast. 15¢ @ 15.50
Extra Cast. 16¢ @ 17.50
Circular Saw Plates. 14¢ @ 14.50
Round Machinery, Cast. 16¢ @ 16.50
Swaged, Cast. 16¢ @ 16.50
Best Double Shear. 16¢ @ 16.50
Blister, 1st quality. 16¢ @ 16.50
German Steel, Best. 16¢ @ 16.50
2d quality. 16¢ @ 16.50
3d quality. 16¢ @ 16.50
Sheet Cast Steel, 1st quality. 15¢ @ 15.50
2d quality. 15¢ @ 15.50
3d quality. 15¢ @ 15.50
Tin. 15¢ @ 15.50
Bars. 21.50 @ 22.00
Strips. 20 @ 20.50
English. 21 @ 21.50
Bar. 22 @ 22.50

Charcoal Tin Plates.

Soldered.
1 C 10x14. 25 sheets. \$5.50 @ 5.25
1 C 12x13. 12.00 @ 18.00
1 C 20x28. 7.00 @ 8.00
1 X 10x14. 7.00 @ 7.75
1 X 12x13. 7.00 @ 7.75
1 X 14x20. 7.00 @ 7.75
1 X 14x28. 7.00 @ 7.75
1 C 12x28. 10.50 @ 10.25
1 C 20x30. 13.50 @ 13.00
For each additional X add. 1.50

Coke Tin Plates.

Best. Ordinary.
1 C 10x14. \$5.50 @ 5.10 @ 5.25
1 C 12x13. 5.25 @ 5.25 @ 5.375¢
1 C 12x12. 5.25 @ 5.25 @ 5.375¢
1 C 10x20. gutters, 25 sheets. 7.75
1 C 20x28. 112 sheets. 10.50

Tin Boiler Plates.

XXX 14x26, 2 sheets for No. 7, 112 sheets. @ 13.50
XXX 14x26. 3 " No. 8. 14.50
XXX 14x31. 2 " No. 9. 16.00
XXX 14x31. 2 " No. 10. 16.00

COPPER.—Duty: Pig, Bar and Ingots, 4¢; Old Copper, 4¢ per lb. Manufactured (including all articles of which Copper is a component of chief value), 4¢ ad. valorem.

Ingots, Lake. 15¢ @ 15.50
Ingot, Baltimore. 16¢ @ 16.50
Braziers' Copper, ordinary sizes, 15 oz. per sq. ft. and over. 16¢ @ 16.50
Braziers' Copper, ordinary sizes, under 15 oz. and over 12 oz. per sq. ft. 16¢ @ 16.50
Braziers' Copper, 10 oz. and 12 oz. per sq. ft. 16¢ @ 16.50
Lighter than 10 oz. per sq. ft. 16¢ @ 16.50
Circular Bars, 8 in. in diam. 16¢ @ 16.50
8 in. diam. and over. 16¢ @ 16.50
Segment and Pattern Sheets. 16¢ @ 16.50
Locomotive Fire-Box Sheets. 16¢ @ 16.50
Sheathing Copper, over 12 oz. per sq. ft. 16¢ @ 16.50
Bolt Copper. 16¢ @ 16.50
Copper Bottoms. 16¢ @ 16.50
Nickel-Plated Sheathing. 16¢ @ 16.50
Plating extra. 16¢ @ 16.50
Flat Copper Boiler Bottoms or Pit Bottoms, cut to special sizes. 16¢ @ 16.50

Tinning.

14x48, by the case. sheet, 8¢
14x48, less than case. sheet, 8¢
For tinning both sides, double the above amount.

O'Neill's Patent Planished Copper.—Net. 14x48
12 and 16 oz. and heavier. By the case. 34¢
12 oz. and lighter. 37¢

Boiler Sizes.

7 in., 14x52. 8 in., 14x52. 9 in., 14x60.
14 and 16 oz. and heavier. 37¢ By the case. 34¢
(And all sizes not over 20 in. wide.)

14 and 16 oz. and heavier. 39¢
12 oz. 42¢

Copper Wire. (See Wire.)

Sheathing Metal.
ellow Sheathing Metal, 7¢ per lb. 20 @ 20

BRASS AND GERMAN SILVER.
Brown & Sharpe's Gauge the Standard for Metal;
Old English Gauge the Standard for Wire.

Brass Manufacturers' Price List, January 17, 1884. 90¢

HERMANN BOKER & CO.,

101 and 103 Duane Street, New York.

PROPRIETORS OF



VISE & TOOL WORKS.

PICKS, MATTOCKS, GRUB HOES, HAMMERS.

WROUGHT IRON STEEL FACE

(P. W. PATTERN.)

"FULLY WARRANTED."



Sole Agents for

H. BOKER & CO.'S Celebrated "Tree" Brand Cutlery,
WARD & PAYNE'S Sheep Shears,

GARDNER'S 1881 Razors,

R. HEINISCH'S SONS'

Celebrated Tailors' Shears, Trimmers, Scissors, &c., Japanned and Nickel-Plated
Every pair warranted.

GEO. WOSTENHOLM & SON'S, WADE & BUTCHER'S Pocket Cutlery and Razors.

JNO. WILSON'S Butcher Knives, Steels and Shoe Knives.

NEW ENGLAND CUTLERY CO.'S Table Cutlery.

W. BUTCHER'S Files and Tools,

GUNS AND PISTOLS, ARMS AND AMMUNITION.

S. H. & E. Y. MOORE,

163 & 165 LAKE ST., CHICAGO,

Heavy H'dware & R.R. Supplies

MANUFACTURERS OF

"CLIMAX"

BARN DOOR
Hangers,

"ZENITH"

BARN DOOR
Hangers,
FOR WOOD TRACK,

Moore's Freight Car
Door Hangers,

BAGGAGE CAR DOOR
HANGERS,

RAILROAD HANGERS,

Parlor Door Hangers.



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Eastern Agents: H. B. NEWHALL CO., 105 Chambers St., New York; 47 Pearl St., Boston.

J. STEVENS & CO.,

P. O. Box 224, Chicopee Falls, Mass.,

MANUFACTURERS OF

SPRING CALIPERS, DIVIDERS,

FINE MACHINIST TOOLS

and FIRE ARMS. Our

SHOOTING GALLERY RIFLE

is the favorite everywhere.

SEND FOR ILLUSTRATED CATALOGUE AND DISCOUNTS.

(No. 11.)

S. CHENEY & SON,

MANLIUS, N. Y.

MANUFACTURERS OF LIGHT AND MEDIUM WEIGHT

GRAY IRON CASTINGS.

METAL PATTERN MAKERS AND JAPANNERS.

Correspondence solicited.

ALEXANDER BROS

BEST OAK BELTING

PHILADELPHIA.

Elizabethport Steam Cordage Co.,

MANUFACTURERS OF MANILA, SISAL AND TARRED

CORDAGE OF ALL KINDS.

BINDER TWINE A SPECIALTY.

46 South Street, New York.



THE WOODRUFF'S PATENT CELEBRATED AMERICAN SUSPENDING KATE TROUGH HANGER.

The best in the world. Manufactured by G. W. HEARTLEY, 301 St. Clair St., Toledo, Ohio. Send for prices.

E. M. FULTON,
D. B. WHITLOCK,
L. W. LUKENS.

METALLURGICAL NOTES.

Utilization of Zinc Flue Deposits. The following remarks on the utilization of flue deposits formed in the distillation of zinc are from a paper by Dr. Kosman, which appeared in a German publication, the translation being printed by the British Institution of Civil Engineers in their "Abstracts of Foreign Papers": About 1865 the old method of drop condensation in open receivers was abandoned in the Silesian zinc works, and the Belgian system of tubular collectors and closed fume catchers was substituted, and this change has now become general. In these the zinc vapor escaping condensation in the first tube is collected, forming a very finely-divided dust of a gray color, which is pyrophoric, and consists mainly of finely-divided zinc, with some cadmium and lead, and as the zinc is mostly in the metallic state it forms a valuable by-product in the manufacture. The dust collected during the first six hours of the distillation contains nearly the whole of the cadmium in the charge, and is put aside to be utilized as a source of that metal by a fresh distillation, in which, however, the bulk of the lead and zinc are lost. This process is confined to a small number of works. The ordinary dust, also containing a certain amount of cadmium, is either returned to the zinc retorts or sold for chemical purposes (as a very energetic reducing agent), its use being determined by the state of the market for zinc and zinc dust respectively. The amount of zinc dust produced of the ordinary quality, with charges yielding 9 to 16 per cent. of zinc, is 10 to 14 kg. per furnace with 32 muffles in the 24 hours, or per charge of $\frac{1}{10}$ kg. in each muffle 310 to 440 grams. Of the first, or cadmiumiferous dust, the quantity is, in round numbers, 300 grams per muffle upon a 16 per cent. yield. The proportion of cadmium averages about 3, but sometimes reaches 3½, per cent. These figures correspond to about 5 or 5½ per cent. of the yield in crude speleter, so that for the whole annual production of Upper Silesia the dust produced is 3035 tons, of which the cadmiumiferous portion forms about 1240 tons.

Latterly several modifications have been adopted in the method of catching zinc dust, partly for the purpose of obtaining a higher yield, and partly to render the furnace-work more bearable for the workmen, by a better condensation of the metallic vapors. The most important of these are Recha's double condensers, which give a large surface for condensation by the use of a second catcher placed horizontally above the first, and provided with a discharge-pipe leading the uncondensable gases into flue chambers; and Kleeman's condenser with a fire and grate, which resembles the American method of making zinc white, the metallic vapor being burnt as it issues and converted into oxide, which is collected in chambers, so that there is no formation of zinc dust proper. The composition of the products obtained by these different arrangements is as follows:

I. Gray zinc dust.

	I.	II.
First or	Second or	cadmiumiferous
Zinc	20,000	84,463
ZnO	8,834	4,881
Cadmium	1,651	2,654
Lead	2,018	4,276
FeO	1,124	0,906
Al ₂ O ₃	0,200	0,200
MnO	1,815	—
CaO	2,804	2,804
MgO	0,675	0,239
SiO ₂ and residue	0,230	0,130

No. I is from Theresienhütte, working poor ores of 9 to 12 per cent. produce for zinc. No. II is from Silesia Hütte, working 16 per cent. ores. Both contain sulphuric acid, but not in weighable quantity.

2. Zinc smoke from the collecting flues, for Silesia Hütte. This is reddish or dirty gray powder, containing

ZnO	54.45	= 49.72 zinc.
CaO	3.62	= 9.17 cadmium.
PbO	12.34	= 11.50 lead.
SO ₃	3.87	

This is remarkable for the large amount of lead, and more particularly of sulphuric acid, that it contains, the latter having been only found in traces in the first dust collected. The difference is obviously due to the existence of sulphur gases in the zinc flame escaping from the retorts, which are probably to be accounted for by supposing some undecomposed blend to be present in the charge, and, as such gases are in the highest degree inconvenient to the workmen, the general use of such collectors as Recha's, &c., is to be recommended on sanitary grounds.

3. Flue stuff from Kleeman's condenser.

This is a white or straw-yellow powder, becoming dirty gray when diffused through water, and greenish in carbonate of ammonia liquor. It is sold for mixing with zinc white. The composition is

ZnO	88.30	= 70.82 zinc.
CaO	1.46	= 1.37 cadmium.
PbO	4.44	= 4.12 lead.
SO ₃	4.12	

Like the preceding product, it shows a decided proportion of sulphates, but is a valuable material, as containing a large quantity of metallic oxides in a very pure state. As regards the utilization of the products as described above, the author, after describing the methods adopted for their analysis, remarks that the plan of returning the condensed products to the works to be remelted or redistilled is essentially wrong in practice, on account of the enormous loss experienced, especially in the latter operation, the ordinary loss on distillation in muffles being estimated at 25 to 30 per cent. of the total zinc in the charge. It is therefore suggested that Schnabel's method of extraction, by means of carbonate of ammonia, which has for some time been in use for the working up of residues from the zinc desilverizing at Lautenthal, should be adopted somewhat according to the following scheme: The flue stuff is to be heated with a solution of neutral carbonate of ammonia at 30° or 40° C., the resulting zinc-ammonium solution being drawn off and the residue washed with water, the first washings to be added to the solution, while the last are to be used in making fresh ammonia solutions. The first solution, when sufficiently diluted, is heated for some time to 70° C., until the zinc commences to separate, at which time lead and cadmium carbonate and ferric oxide have gone down. It is

then transferred to the still, where the ammonia is driven off by steam and zinc carbonate precipitates. The mother liquor, when containing sulphate of ammonia, goes back to the dissolving process, in order to increase the proportion of sulphate. The zinc carbonate is filtered, pressed and calcined. The residue of lead and cadmium carbonate is cleaned and washed, to produce oxide of lead, whether the cadmium carbonate is decomposed or not being of no consequence. The roasted mixture is then digested with a solution of sugar of lead, the air being excluded as completely as possible. The solution, when cleared, is decanted from the residue, which is washed with sugar of lead solution. Carbonic acid is then passed through the liquor, which precipitates white lead. The cadmium residue is dissolved in dilute sulphuric acid, and precipitated in sulphide by sulphureted hydrogen, or it may be dissolved in nitric acid, and the solution evaporated and heated to decompose the nitrate when brown oxide of cadmium is produced. The advantage claimed for the method proposed is that all three metals are brought into value, whereas under present conditions only that of the zinc is taken into account. Especially as regards cadmium it would be advantageous, as at present it is only brought into commerce in the metallic state, while for technical purposes it is used as sulphide or oxide. The preparation of these from the metal involves the use of an expansion solvent nitric acid, so that while metallic cadmium is sold at 9/ @ 10 per kg., (\$1.02 @ \$1.14 per pound), the sulphide costs 16/.

The extraction process, on the other hand, furnishes the oxide of the metal, which can be taken up by cheap solvents, such as sulphuric and hydrochloric acids.

A Process for Producing Phosphorus Iron.

Mr. Jacob Reese, of Pittsburgh, has patented a process for producing a metal high in phosphorus and carbon and low in silicon, the product being especially adapted for use in the basic Bessemer process. The main feature in his process is the application of the open hearth process to the desilicizing of the iron. In the practice of the ordinary open-hearth process there are three distinct periods in which different chemical reactions take place. In the first, or melting, period about 50 per cent. of the silicon and carbon is eliminated; the second period then commences and the metal remains in a state of rest until the silicon is reduced to $\frac{1}{10}$ of 1 per cent., at which point the carbon is attacked and a violent ebullition begins. By the new process it is proposed to work the blast furnace so as to produce the cheapest quality of metal, irrespective of the amount of silicon present, and then run this molten metal into an open hearth and retain it there at a state of rest until the silicon is reduced down to about the $\frac{1}{10}$ of 1 per cent., when the treatment in the open hearth is discontinued, thus dispensing with the first and third periods and retaining the necessary amount of carbon. In the production of the phosphoric metal by Mr. Reese's process the iron ores are first smelted with limestone and carbonaceous fuel, together with suitable quantities of phosphoric basic slag to phosphorize the metal to the desired degree, in a blast furnace. The amount of phosphoric slag used should be sufficient to produce a metal containing a minimum of 2 per cent. of phosphorus. This silicious phosphoric metal is then run into an ordinary silicious-lined open hearth, and preferably treated with oxide of iron—about from 5 to 20 per cent. of oxide to the weight of the metal; or the metal may be treated without the oxide, but in this case desilicization will not be so rapidly effected.

The amount of oxide will depend upon the amount of silicon present in the metal. This treatment should be continued until ebullition takes place and the metal boils, which, it is claimed, is a positive and unerring indication that the silicon has been reduced to the $\frac{1}{10}$ of 1 per cent. The molten metal should then be immediately withdrawn from the furnace. If it is found that dephosphorization takes place to any considerable extent in the open hearth, which will be the case if the bath or slag is highly basic, then, in such case, the metal should not be run out when the silicon is reduced down to $\frac{1}{10}$ of 1 per cent., but the metal should be allowed to remain and boil for about 10 to 20 minutes, which will leave but a trace of silicon, and the carbonic oxide evolved during this continuation of the treatment will decompose the phosphates in the slag and cause the phosphorus to drop back again into the metal. By the means above specified Mr. Reese claims that he is enabled to produce a cast iron containing from 2 to 3 per cent. of phosphorus and only the $\frac{1}{10}$ of 1 per cent. of silicon, and having about the same per cent. of carbon as the metal contained when run out of the blast furnace.

An Improved Heating Furnace.

Mr. E. Windsor Richards, of Middlesboro', England, has patented an improved heating furnace which is designed to enable ingots and other articles, such as slabs of steel, to be equally heated for rolling or other purposes with less labor and at less cost than is now usual. For this purpose he employs a heating furnace provided with chambers to contain ingots or slabs in a vertical position, and so connected with one another and with the furnace that heat entering one chamber shall pass over the top of the ingot or slab down over its whole length, then into another chamber, and so on successively, thus heating uniformly all the ingots or slabs contained in the series of chambers without their having to be turned over during the heating process. The furnace may be heated by gas or otherwise. Mr. Richards considers it advantageous to use a gas regenerative furnace, such as the Siemens. A furnace, according to this invention, may be provided with one or several rows of ingot or slab chambers such as referred to above, the end chamber of each row when a gas furnace is employed being connected to an air chamber and to a gas chamber, and each intermediate ingot or slab chamber being in communication with the upper part of that next to it at one side, and with the lower part of that next to it at the opposite side. The tops of ingots usually have, before being reheated, a lower temperature than the other portions. In order to insure sufficient heating of the upper part of each ingot there are provided

division walls between two chambers that are connected at their bottoms, and also a flue regulated by a damper to connect the chambers near their tops. An overhead traveler is provided for depositing the ingots or slabs in and removing them from the vertical chambers.

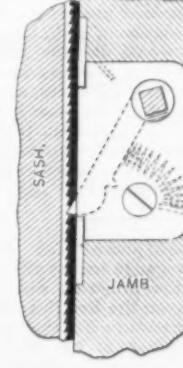
Producing Iron Low in Phosphorus.

P. L. T. von Schöning, of Vienna, has invented a process of making iron, the object of which is to produce pig iron from the blast furnace free or nearly free from phosphorus when working upon ores containing phosphorus. To this end the ores are brought in a heated state into contact with substances capable of forming chemical compounds with phosphorus, which compounds are removed either in the form of gases or slag. The union of the phosphorus with such substances may be effected either in roasting furnaces or in the blast furnace itself. The invention may be carried into effect in different ways, depending upon the local conditions under which it is performed. According to one method, the ores are roasted in admixture with basic materials, such as alkalies or alkaline or carbonaceous earths, limestone, alumina, potash, soda, common salt and the like, and part of the phosphorus becomes combined with these substances. There is also used in the roasting furnace substances which contain elements of the chlorine group. After wasting, superheated steam is forced through the roasted product. When seaweed is readily obtainable it is mixed with the ore and fuel, its iodine and chloride of soda forming gaseous compounds with the phosphorus; the superheated steam also combines with the phosphorus, forming phosphated hydrogen, and all these gases escape. The limestone absorbs part of the phosphoric acid, and a similar result follows the use of minerals containing manganese. The materials used to combine with the phosphorus in the blast furnace, and to carry the same away in the slag, are of a basic nature, and consequently the slag will be basic. Basic slags, however, containing limestone and clay are deficient in fluidity, and this difficulty is overcome by adding fluorite to the charge, which produces an easily-flowing basic slag, and, according to the proportion in which it is used, produces a slag of the required consistency.

HARDWARE NOVELTIES.

The Acme Sash Lock and Balance.

A new form of Sash Lock and Balance, made by the Acme Lock Company, Newark, N. J., and for which Hynes & Hart, 34 Murray street, New York, are the general agents, and Butler & Constant, 18 Warren street, New York, are sales agents, is illustrated in Figs. 1 and 2 of the engravings. The device automatically locks both upper



The Acme Sash Lock and Balance.—Fig. 1.—The Parts for the Upper Sash.

and lower sash at every $\frac{1}{4}$ inch. By this means ventilation and security from intrusion are obtained. By the use of this device sash weights and sash fasts of the common description are avoided, with the advantage of a material saving in first cost. The general features of this lock and balance may be gained from the cuts. The first shows it in the shape applied to an upper sash. The essential parts are a rack, in the form of a light casting screwed to the sash,

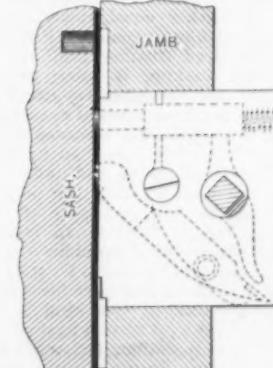


Fig. 2.—The Parts Used on Lower Sash.

The lock is attached to the sash and consists of a pawl controlled by a spiral spring working against the rack. By this it will be seen that the sash may be raised, but cannot be lowered, without lifting the pawl, which can only be done from the inner side. Fig. 2 shows the device arranged for use on a lower sash, and shows an additional feature necessary in that position, namely, a bolt for holding the sash up. The bolt is not depended upon alone to keep persons outside of the house from raising the window, but there is, in addition, the same features of rack and pawl as mentioned above, used, however, in a reversed position. By the arrangement of parts it will be seen that the same movement of the hand of the person opening the window releases both bolt and pawl.

Adjustable Iron Planes.

By means of Figs. 1 and 2 the general appearance and construction of Steer's Adjustable Iron Planes are shown. The special fea-

tures embodied in these tools, which are being introduced to the trade by C. E. Jennings & Co., 96 Chambers Street, New York, are as follows: The bottom of the plane is made in composite form, as shown in Fig. 2. The metal is inlaid with rosewood strips firmly dovetailed, and so combined as to prevent the wood from wearing away. This improvement overcomes the very

graving. Several sizes are made, adapting the article to various uses. The clamps are of malleable iron and well made.

Some Things in and About Buffalo.

The above title has been given to the very handsome souvenir, which has been recently issued, of the annual convention of the American Society of Civil Engineers, which was held at Buffalo June 10-13 of the present year. It is an oblong volume, measuring 7 x 9 inches. In place of the conventional binding the various sheets composing it, with the cover, have been fastened together by brass eyelets. A blue silken cord, with tassel drawn through these, serves to complete the work, and adds very much to the effect. The first page of the cover has for a center piece a distant view of the city. This is surrounded by a blue border, while in a scroll, fancifully worked at one end, appears the title in irregular lettering. The groundwork of the page is a tint between straw color and buff, with patches of bronze, irregular in form, worked in and about the letters scrolls and picture above referred to, in a way to present one of the most attractive compositions that it has been our fortune to examine in a long while. The pages within the volume are no less dainty and interesting than the cover. The title page is worked in red and blue, with illuminated initial letters. The pages of the text following are also worked in two colors. By way of preface we are informed that the work was compiled under the direction of the committee of resident members by Wm. Thurstone, secretary of the Buffalo Merchants' Exchange. Following this is a list of the several committees, and then

we reach the subject matter of the work. Various buildings, public and private, docks, elevators, engineering works, parks, &c., in and around Buffalo are presented by very handsome photo-prints, and are briefly described in the elegantly printed letter-press. No less than 14 views are presented, all of which were produced from photographs specially prepared for this work by George Barker, of Niagara Falls. Interspersed with the particulars concerning the various views are many items of statistical importance, making the volume one of value, as well as of interest, on account of its art features. The last page of cover is worked in the same colors as the first, already described, and contains a fac-simile of the badge of the society, the following: "Annual Convention of the American Society of Civil Engineers, at Buffalo, June 10-13, 1884." This souvenir, which we are sure will be prized by all who are fortunate as to obtain a copy, has been published and copyrighted by Messrs. Matthews, Northrup & Co., of Buffalo. We have had occasion to refer to the excellent work which this firm is producing on former occasions. It seems as though every new thing which they put out is handsomer than its predecessors. The taste and care with which the present work has been prepared speak in the highest terms of the artistic ability and mechanical resources which this firm possess.

New Egg Poacher.

The accompanying engraving represents a new utensil for kitchen use, known to the trade as the Adams Egg Poacher. This article is the invention of a practical house-keeper, and was produced after long years of experience. It is claimed to do away



New Egg Poacher.

with all the difficulties that attend the old method. It is said there is no wasting or spreading of the eggs, that they require no attention while cooking, and when done can be drained perfectly dry without being disturbed. The results are to produce eggs more palatable and inviting in appearance, each egg being perfectly round. The utensil is useful for other purposes than the one specifically described. The outside basin is a 4-quart pan and made of 1 X tin, and is of the size commonly used in puddings, custards, &c. It is manufactured by the Adams Manufacturing Company, corner of Main and Sycamore streets, Cleveland, Ohio.

New Form of Clamp.

F. Armstrong, of Bridgeport, Conn., is manufacturing a new form of Clamp, known as the Davis Patent Clamp, a sectional view of the working parts of which is afforded by the illustration herewith. In its general features and in the results accomplished it is not unlike some of the quick-motion vises now prominently in the market. This clamp has the special advantage over others that it clamps the work without displacement. The plunger or screw does not turn the adjustable jaw, but is forced directly on the work by the thumb-screw. By examination



DAVIS PATENT CLAMP.

of the engraving it will be seen that the jaw is readily adjusted to the work by slipping the barrel of the screw in or out, which is made possible by simply raising the lever shown near the center of the cut. When the clamp has been adjusted in this manner as near as may be, the lever is released and the work clamped in the usual manner by means of the thumb-screw. One great advantage of the clamp is the speedy

The History of Photometry.

The following history of photometry is from the report of the Scientific Commission at the Munich Electrical Exhibition:

Photometry is a subject which has developed with the electric light. Formerly it did not appear to offer any great difficulties, and it has consequently been treated somewhat superficially in our text-books of science. For the electrician, photometry has a two-fold importance; the function of the photometer is, firstly, to show what quantity of light a certain lamp supplies, so that its economy may be judged; and, secondly, to demonstrate the relations between the light produced and the other forces at work in a given system of machines and lamps. It was only when this latter point became better understood that photometers began to engage the attention of the electrician.

The first photometric tests referred to in text-books of science generally are those of Fizeau and Foucault, of 1843. It must, however, be borne in mind that what these eminent scientists originally measured is not that which really interests us at present in such experiments; the decomposition of an iodine and silver combination, by means of light from various sources, indicated the chemical intensity of the rays, but not the optical intensity. The surprisingly low chemical intensity of the limelight caused MM. Fizeau and Foucault to repeat their experiments in order to determine the optical energy; and the agreement of the new and old figures suggested to them that for white light two determinations might practically be replaced by the one which is more convenient, that is the chemical test. It is evident, however, and needs no further support in these days, when we photograph the invisible ultra violet spectrum, that chemical tests cannot be relied upon, and that photometers like Béquerel's electro-chemical actinometer, or Siemens' selenophotometer, cannot measure the illuminative power of a source of light, however perfect and ingenious they may be in other respects. We have still to depend upon the physiological action of the light rays upon the retina of our eye, untrustworthy as this may be, since different observers are not equally sensitive to the same degree, and even the same observer is not so at all times.

The photometrical researches of Th. W. Casselmann, of Marburg, are of interest for the electrician, because they included the electric light, because they were prior to those of Fizeau and Foucault, and because in them there was first introduced Bunsen's photometer, in favor of which Casselmann decided against Ritchie and Rumford.

No accurate tests appear to have taken place after that before 1855, when MM. Lacaugne and Thiers tried their electric lamps at Lyons. M. Edmond Béquerel reported on those trials to the Société d'Encouragement of Paris, and this report led to a contest between the interested parties, as Béquerel estimated the intensity at 350 candles, while the manufacturers claimed 600 and more. This contest was of importance, because the real point was the question of expense. Scarcely any tests of real scientific value were, however, undertaken before the Alliance magneto-electric machines in France, and those of Mr. Holmes and others in England, attracted attention. Then difficulties cropped up everywhere, and the main problem has not been solved up to the present day. Neither the French beccarcel, nor the English standard candle, nor the German candle, can be considered as normal, as they are all variable; this is strikingly evidenced by the fact that the ratios between the different standards, as stated in hand-books, do not agree. Many proposals have been made; MM. Rüdorff and Methuen suggested that the middle part of a flame, as more steady than the flickering top and the lower zones, ought to be observed; Mr. Vernon Harcourt and others proposed to burn mixtures of air and normal gases, and the former gentleman exhibited a neat normal lamp of about 3-candle power, at the Southport meeting of the British Association. But these devices were mostly too delicate and complicated, and Mr. Louis Schwendler, one of the many electricians whose deaths we have lately had to lament, perhaps made the most practical suggestion in once more drawing attention to Mr. J. W. Draper's idea of using a fine platinum wire, heated by a constant current. Schwendler's units are sheet platinum horseshoes of .017 mm. thick; but these again are open to objections, as we shall find. If we return to our historical abstract, we find M. Tresca, in 1876, experimenting with a Foucault photometer, a modification of Rumford's instrument, which is largely employed in France and comprises a milk glass disk, whose two halves are illuminated by the lamp to be examined, and the standard candle respectively. Tresca experienced difficulty from the different colors of the lights, and interposed tinted glasses before them. Very instructive were the tests at the South Foreland lighthouses, conducted by Messrs. Tyndall and Douglass, and fully described in the Trinity House Report, 1876-77. The electric lights were compared to a powerful colza oil lamp, kept as nearly as possible constant at 722 standard candles; this comparison was effected by a Bunsen photometer, the colza lamp being again controlled with the help of a Sugg photometer. As the arc itself emits very little light while the greater part comes from the negative carbon, and a smaller amount from the positive, the necessity arose of taking, even with the two carbons vertically above one another, observations in various horizontal planes. M. Allard has further pointed out that even the various points of the vertical plane of the normal candle do not receive equal quantities of light. The report on his very extensive tests at the French lighthouses to the French Ministry ("Mémoire sur les Phares Electriques"), Paris, 1881, forms a very valuable contribution to the literature on photometry. M. Fontaine's observations on the Gramme machines and Serrin lamps, described in his "Éclairage à Electrique," second edition, 1879, also deserve mention for their completeness. Both MM. Allard and Fontaine used Foucault's photometer, and suggested ways to arrive at mean values with very unsteady lamps; these proposals are, however, hardly of practical weight, nor could M. Allard's idea

of verifying his figures, with the help of a Crookes' radiometer, contribute much to their corroboration, as this comes scarcely within the functions of a radiometer. Foucault's photometer was likewise employed when MM. Sautter, Lemmonier & Co., of Paris, were testing their photo-electric apparatus for military operations, the lamps being supplied with Colonel Mangin's aplanatic reflector; green glasses were also, in this case, interposed to equalize the colors.

A similar arrangement was adopted at Rouen in 1881, when, on behalf of the Société Industrielle, the systems of Jablachoff, Gramme and Siemens were subjected to a series of comparative tests. Here, again, a Foucault photometer was used, together with the ordinary beccarcel, and the silvered-glass mirror to make the rays parallel. The loss from reflection was averaged at 30 per cent.; the observations were made at various distances, and a determination was made of the radius of that horizontal plane, which received the same quantity of light as a normal candle could supply at a distance of about 4 m. This was a step in the right direction; the report, "Rapport général sur l'Éclairage Electrique des Quais de Rouen," 1881, shows curves drawn to indicate by their ordinates the light falling upon the horizontal plane.

The municipality of Paris has for some years instituted annual tests of the Jablachoff candles in the Avenue de l'Opéra, which tests finally induced them to abandon those apparatus. The Jablachoff candles shed their maximum illumination, of course, in the plane perpendicular to the line drawn through both candles; the minimum in this line was found to be .57 of the maximum; the mean intensity, however—not the mean between maximum and minimum—was equal to .9 of the maximum, as the intensity curve proved to be of the shape of a figure 8, and not an ellipse. It also transpired that the air was less transparent to the red light of the Jablachoff candles than to the gas rays.

The well-known experiments at Chatham of 1879 and 1880 ought to have been mentioned before this. The apparatus comprised a Rumford photometer and an Argand burner of 40 candle-power, with a Sugg's regulator. Photographs were taken at the same moment of the front and sides of the carbons, and the illuminated areas calculated from these photographs. The average illumination of a point was further derived from these calculations, under the questionable assumption that the light was evenly distributed over the whole plane.

We have already spoken of the difficulty which was met with in comparing lights of different colors. The method of action of the ether vibrations, which excite our optic nerves and create the sensation of sight, is unknown to us, but we know that this function depends upon the wave lengths of the rays. M. Purkinje has shown that two colored planes which appear equally light at a certain distance, seem to lose their light in a different ratio if further removed from the eye. Two lights of different color are therefore incommeasurable. Mr. Dietrich has recently, with more perfect apparatus, repeated the tests by means of which Fraunhofer attempted to determine the illuminative power of the various parts of the spectrum, whose lines he so assiduously studied and noted, without in the least conceiving their character and importance. Fraunhofer had only an oil lamp at his disposal, and, just as we should expect, he was wrong by about 9 per cent. with reference to the rays from the line D in the yellow, as here the two lights were most homogeneous, but wrong by 60 per cent. when analyzing the rays from lines B, G and H. Spectrophotometric observations, such as first proposed by Vierordt, Glan and others, may be perfected to a high degree of comparative accuracy; if we arrange the two spectra to be compared above one another, and divide both by vertical lines into bands of one and the same tint, we may indeed achieve very exact measurements. But this can only be executed in the laboratory, and not in ordinary practice, while, after all, it yields only comparative values for the various colors.

Tinted glasses have often been employed to produce rays of equal color; but such interposition means loss. Captain Abney conceived the interesting idea of watching lights through a photographically-prepared glass plate with a scale of darker and darker bands, through the darkest of which even the sun was not visible. But in the dark the eye gets slowly capable of distinguishing details which were at first quite indiscernible. Further researches, therefore, convinced Captain Abney that the ratio between red and blue in the same electric lamp varied very considerably as the speed of the generator increased, so that the red rays, which originally were half as strong as the blue ones, finally possessed only one-fourth of the intensity of the blue one, both, of course, increasing in intensity with the quicker revolutions. Professors Ayrton and Perry followed Captain Abney in making two series of tests, choosing, however, red and green lights, instead of red and blue. The difficulty remains, however, how really to compare and reduce to unit measurements those two rows of figures. M. Crova (Comptes Rend. xciii. p. 512) went one step further in this direction. He watched the two half-disks of a Foucault photometer by means of two Nicol prisms, with their main sections vertical to one another, and between the pivots he put a quartz plate 9 mm. thickness. If the two lamps are placed in their proper positions both disks appear of a greenish-white tint, and may then easily be adjusted until equal illumination is attained. The theory of this apparatus is too complicated to be discussed here; the main point is that the quartz is designed to produce two broad interference bands toward the end of the spectra; in the middle parts the intensity of the rays varies, but there must be one line at which the rays pass through the pivots without becoming weakened. This maximum of illumination is now, by adjusting the second pivot, to be fixed at those rays whose comparison would yield the same result as that of the total intensities. The apparatus is ingenious, but in seeking for the districts of equal illumination in the two spectra, it presumes that the spectro-photometer received equal amounts of light from both sources, which anticipates the solution of the problem.

The newer photometers of both M. Cornu and Professors Ayrton and Perry permit measurements of strong electric lamps being taken in small rooms without the awkward necessity of removing powerful lamps to great distances to bring them into comparison with the standard candle. Mr. Cornu intercalates between the rays of both lights an achromatic lens whose active aperture may be widened or lessened with a micrometer screw, and thus varies the quantity of light falling upon the photometer. Apparatus of this kind have often been thought of; the star photometers of Steinheil and Herschel are based upon the same principle. Messrs. Ayrton and Perry, in their dispersion photometer, use a concave lens to decrease the intensity of the rays. No loss of light was supposed to occur through absorption in this concave lens if it were only thin enough. Mr. Voller, of Hamburg, has, however, taken exception to this assumption, and pronounced the possibility of losses of 10 per cent., and Messrs. Ayrton and Perry seem after to have silently admitted this source of error by introducing a plane parallel glass plate between the screen and the standard candle to weaken the intensity of the light standard. The losses through absorption in the air Professors Ayrton and Perry observed to be strongest for green light. MM. Bouquer and Allard have further investigated the phenomena of absorption in air; the coefficients vary greatly with the conditions of the air, but they are sufficiently determined to show that in tests where the strong lamp is 50 m. distant from the screen, a loss of about 4 per cent. has to be taken into consideration.

We have finally to speak of the labors of the third section of the Congress at Paris in 1881. The candle found practically no advocate, although Dr. Werner Siemens declared that a good candle need not vary by more than 5 per cent. MM. Tochikoff and Béde stood up for Schwendler's platinum unit, but M. Crova objected because platinum had no constant molecular structure, and consequently no constant emissive power; small differences of temperature would further lead to inexact figures. M. Viollet recommended the use, as a unit, of the quantity of light radiated by 1 square cm. of platinum at melting point. MM. Werner Siemens and Cornu assented, but preferred silver. Sir William Siemens proposed an iridium wire under the influence of the unit of current. MM. Neujean and Flamache caused slight surprise by praising the magnesium and lime lights. For want of anything better, the old beccarcel was finally left in office, although M. J. Dumas pronounced it too weak. The discussions on photometers were less warm. M. Bergé made the curious proposal to remove the lamp until a white screen would no longer be visible through a solution of the sulphate of copper ammonia. The great problem of what to do with reference to the various colors also remained unsettled. M. Allard suggested the creation of a blinking effect, as then all colors would dissolve into one uniform gray, and Dr. Gladstone proposed the employment of long distances, across which the differences of colors would disappear. The proposal of M. Rousset that for each lamp the equation of the intensity curve $J = f(a)$ should be calculated was warmly supported and accepted.*

Railway Equipment for Africa.—A train of narrow-gauge trucks and passenger carriages for the proposed railway across the desert between the Red Sea and Berber, says the London Standard of the 19th ult., are in course of shipment at the Royal Arsenal for Suakin. They were yesterday placed in lighters for conveyance to the Albert docks, and will this morning be taken on board the British India steamship Navarino, which will sail next Wednesday for the East. The passenger trucks will each carry 12 soldiers, and a brakeman on a platform in rear. They are lightly built, with tilt covers, and are open at the sides, but have stout blinds of oiled canvas on rollers, for use if necessary. Although the under carriage is fitted to the narrow-gauge of 18 inches, the body of the vehicle is 6 feet wide, and the seats are balanced over the wheels like those of an outside car. The goods trucks are longer, but not as wide as the passenger carriages, and are more numerous. With them are being sent a further consignment of the railway iron and a large quantity of timber. Meanwhile the hired steamer Dunlure, just returned from Suakin, is being reloaded with ordnance and commissariat stores and a considerable freight of medical necessities. She has drawn from the reserves in the dock yard at Woolwich more than 2,000,000 pounds of preserved meat and other provisions for the men forming the proposed expedition, together with a supply of compressed forage for the horses. In front of the ordnance stores office, specimens of the india-rubber tanks which are to be used for holding water in the desert have been set up and filled for inspection. One kind is completely inclosed, as a protection against contamination and evaporation, but the others are open at the top. They are supported by lashings to ordinary picket posts, and are likely to prove very serviceable in the desert.

From Selling Hardware to Managing Railroads.—Mr. John King, Jr., the new president of the Erie Railroad, was born in Baltimore, was there educated, and is now 52 years old. It may interest our readers to know that he was brought up in a hardware store, and was afterward for two years in the office of the Adams Express Company. In 1854 he entered the employ of the Baltimore and Ohio Railroad as ticket agent at Camden Station. Two years later he was made paymaster, and one year after that he became auditor. Subsequently the duties of general freight agent devolved on him. In 1867 the office of vice-president was created for him. He continued in that office for 14 years. He retired in August, 1881, on account of his health. At the time of his retirement he was receiver of the Marietta and Cincinnati and Ohio and Mississippi railroads, and president of the Pittsburgh and Connellsville Railroad.

* Since the date of this report the Paris Congress has decided that a surface of 1 square cm. of melted platinum shall be the standard of light.

Speed on the Ocean.—Again the Cunard steamer Oregon claims the palm as victor in the ocean race between England and the United States. She left Queenstown at 3.21 p.m. on Sunday, August 17, and arrived at Sandy Hook bar at 8.50 p.m. on Saturday, August 23, thus making the passage in 6 days and 10 hours. The distance run each day was as follows:

	Knots.	Knots.
Monday	400	Saturday..... 449
Tuesday	452	To Sandy Hook..... 181
Wednesday	486	
Thursday	432	Total..... 2818
Friday	448	

The fastest previous passage was made by the same vessel last April, the time being 6 days, 10 hours and 10 minutes. The quickest trip made by the American steamship Baltic, of the Collins Line, was 9 days and 13 hours, in the year 1851.

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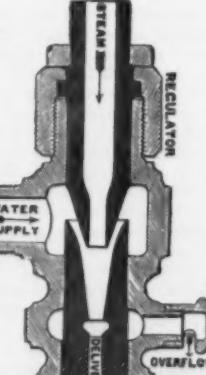
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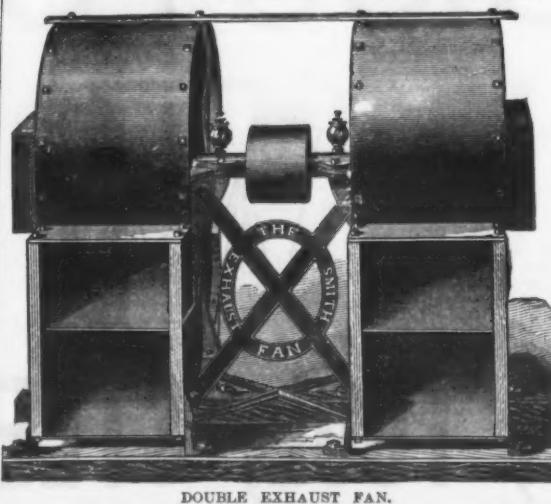
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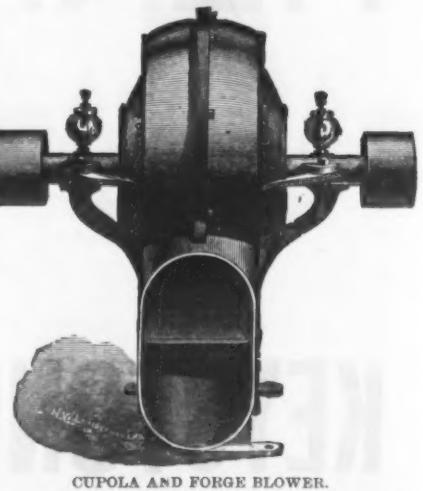
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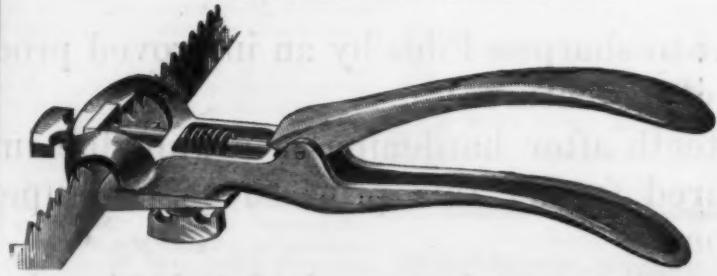
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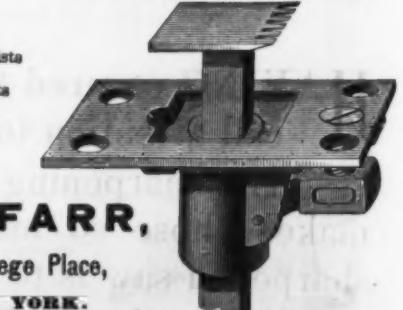
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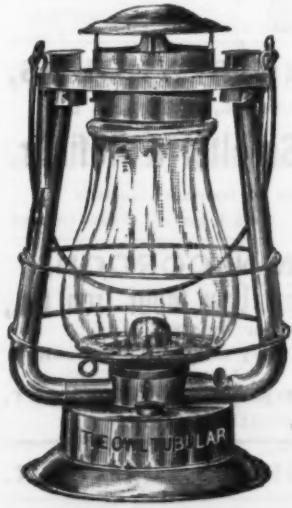
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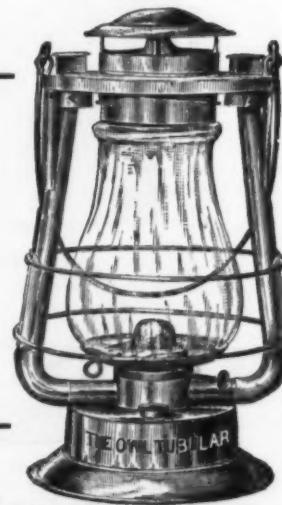
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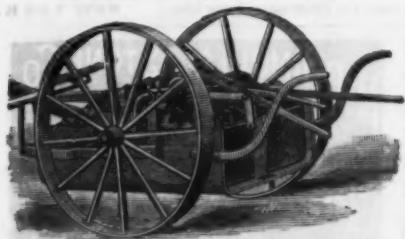


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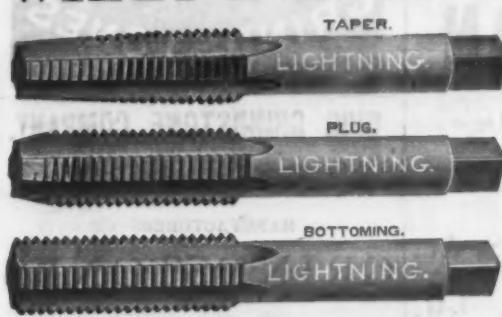
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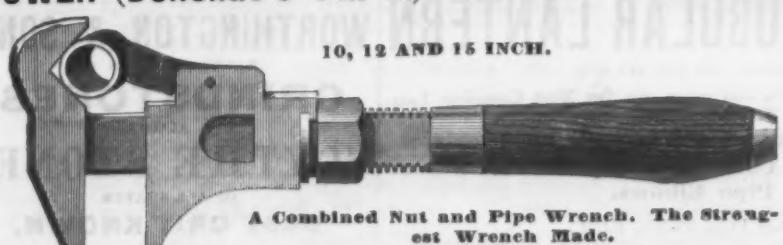
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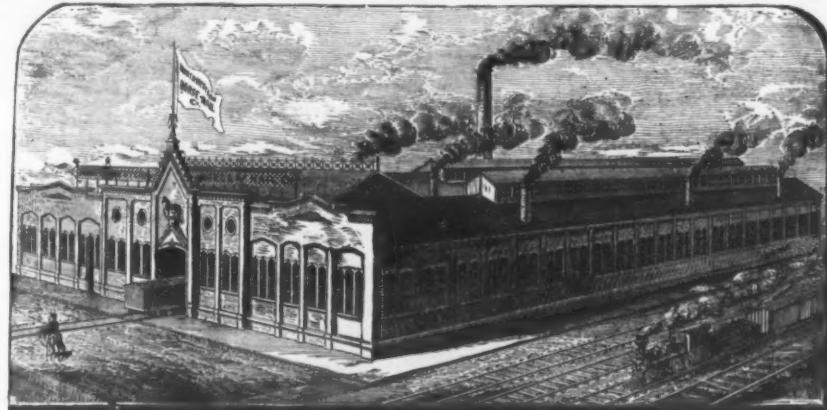
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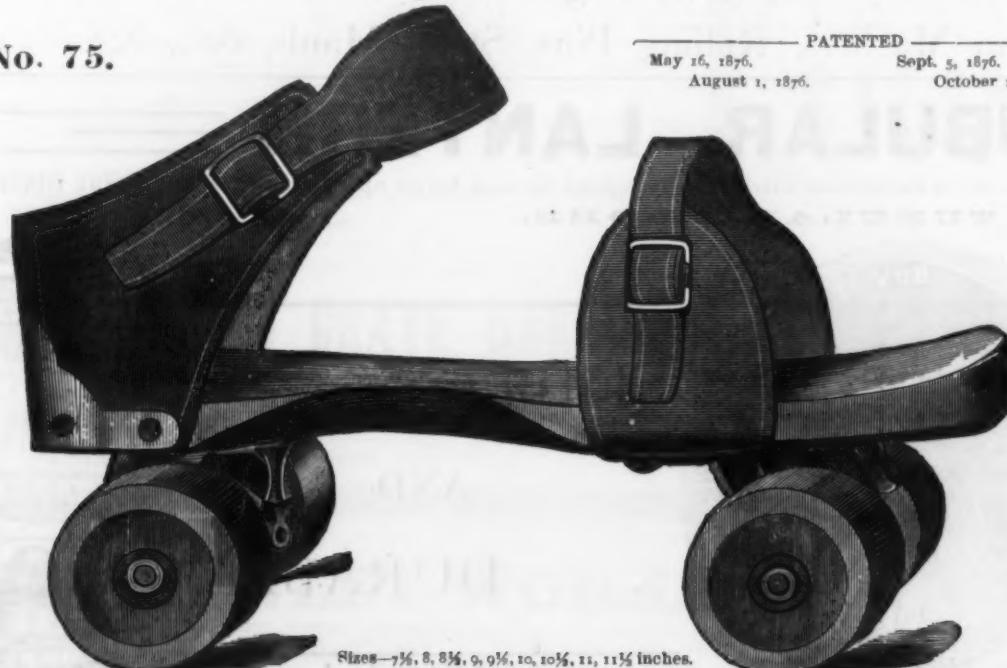
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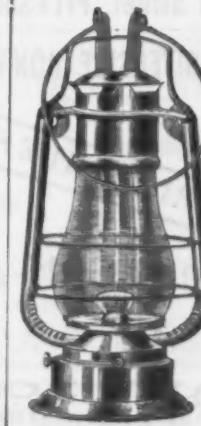
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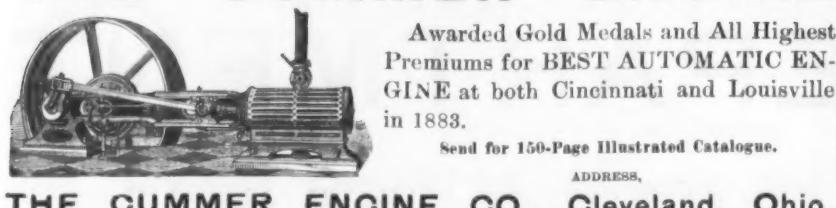
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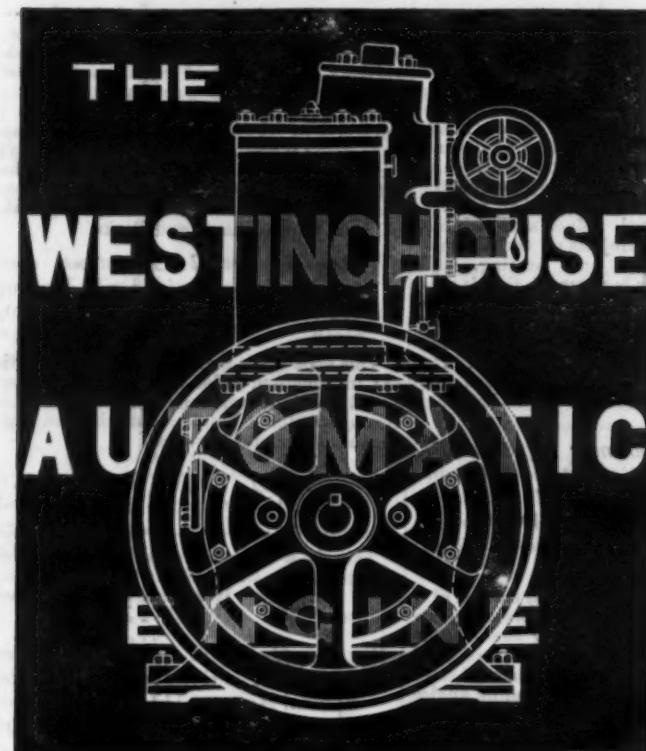
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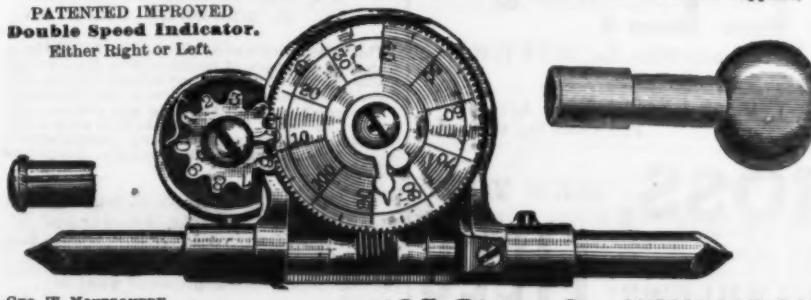
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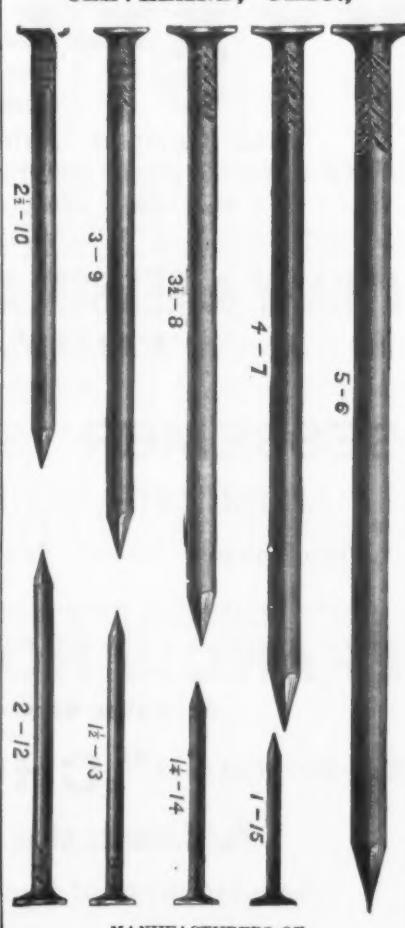
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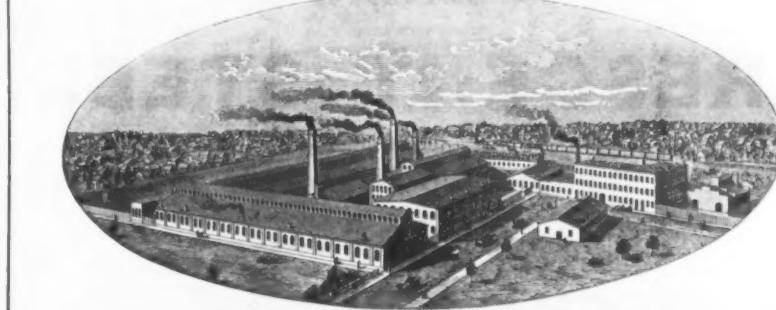
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This list excludes all ordinary trade announcements proper, and is strictly confined to trade-marks and brands, whether blocks, electros or other appliances for illustrations, with just sufficient letter-press to describe the kind of article to which the mark, &c., is applied, and the names and addresses of the owners or lawful users. For the sake of uniformity in space and charges, each mark occupies a space measuring 1 inch deep by $1\frac{1}{2}$ inches wide, and the uniform charge is \$2.50 (10s.) only for each such space, payable in advance unless we have already an open advertising account with the firm giving the order.

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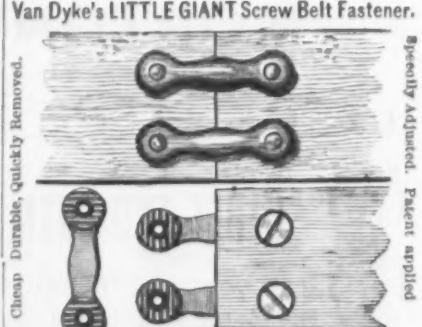
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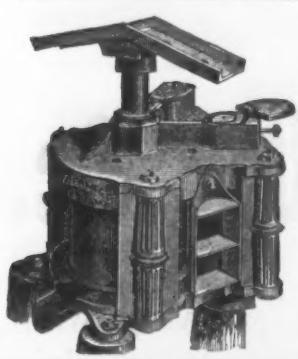
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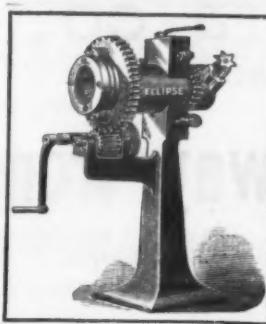


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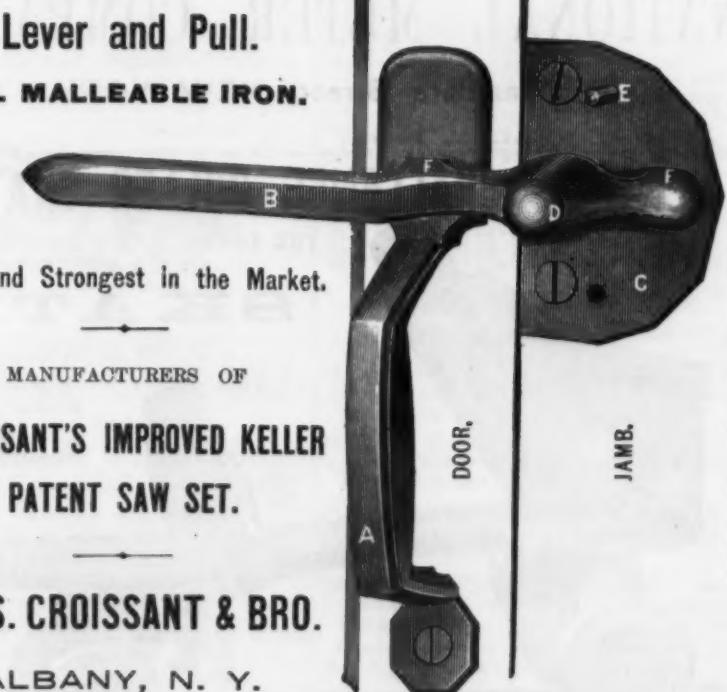
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Philadelphia Carriage Bolts, new list, June 10, 1884.

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Stanley, Barber.

Backus.

Sprofford.

American Ball.

Bolts, Eastern, Narrow.

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Parker.

Chain.

Shepard.

Lull & Porter.

Huffer's.

Casters.—Bed (new list July 1, 1880).

Casters.

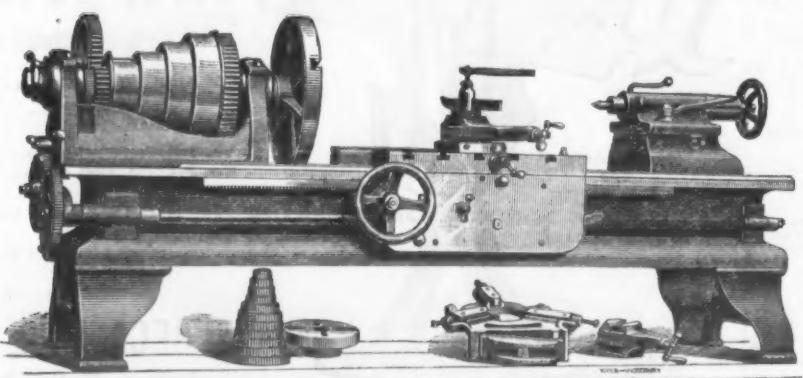
Chains.—German Hailer and Coil, list June, 1884.

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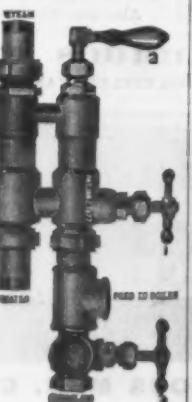
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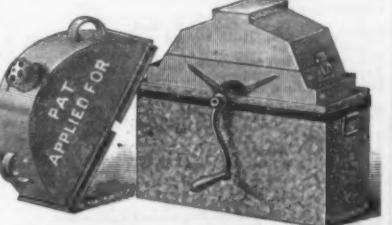
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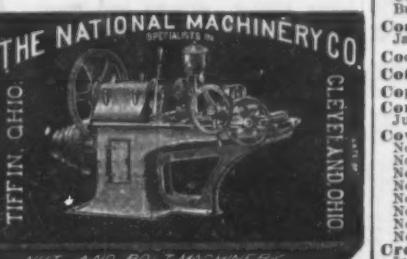
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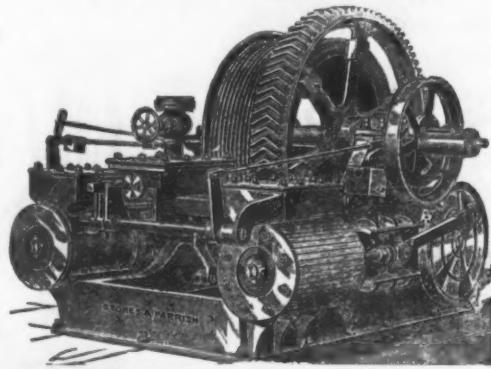
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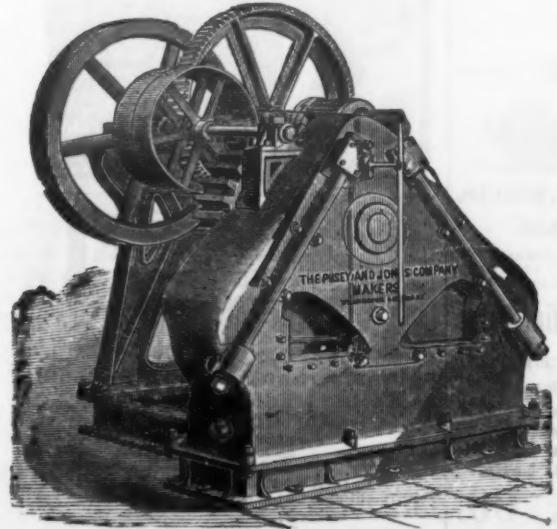
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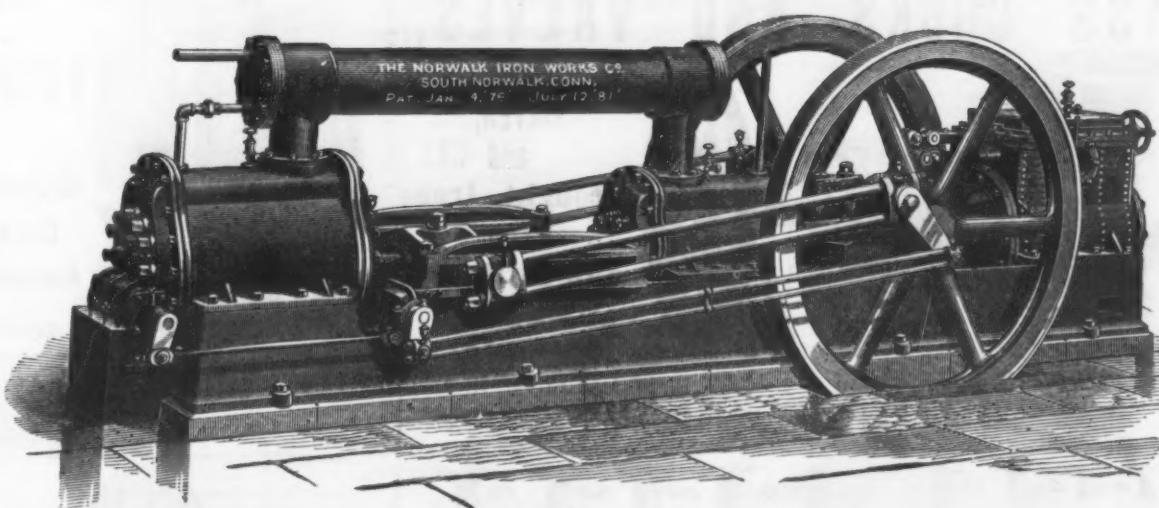
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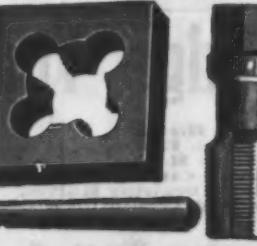
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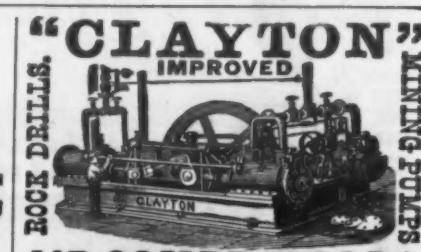
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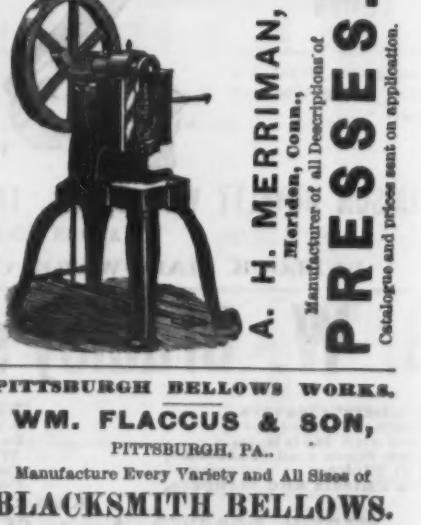
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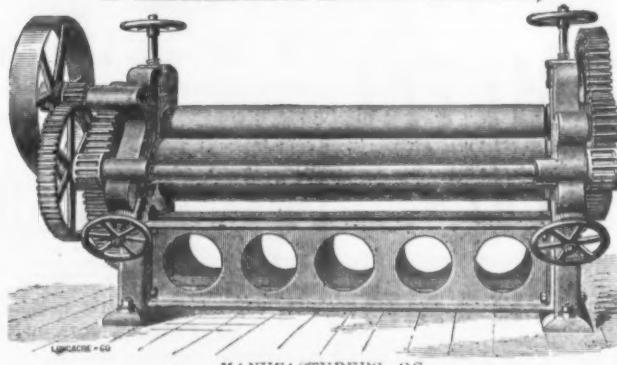
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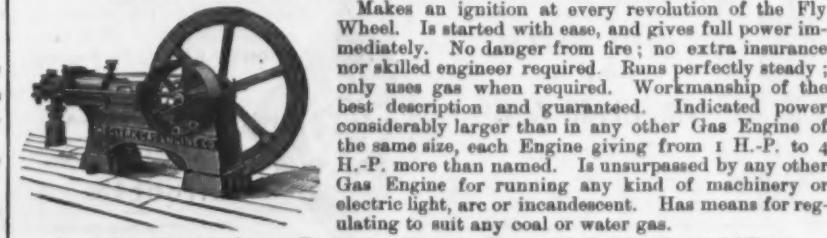
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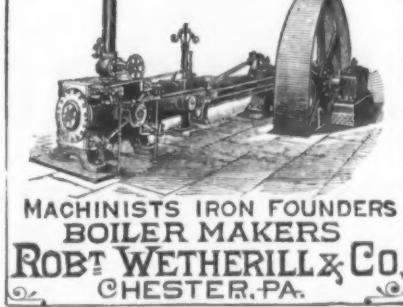
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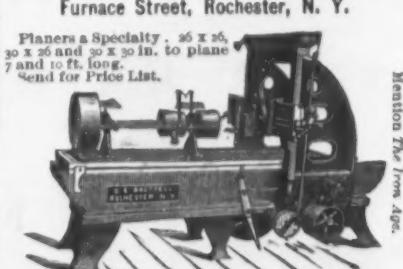
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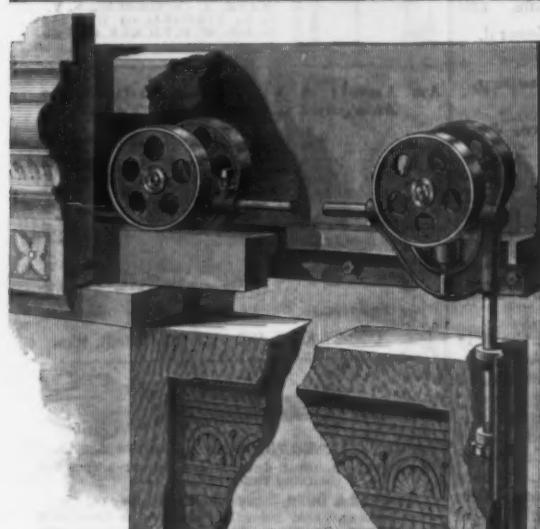
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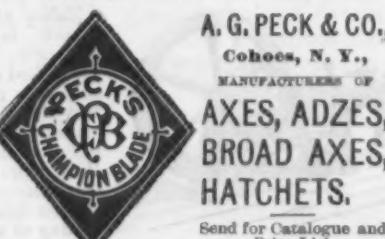
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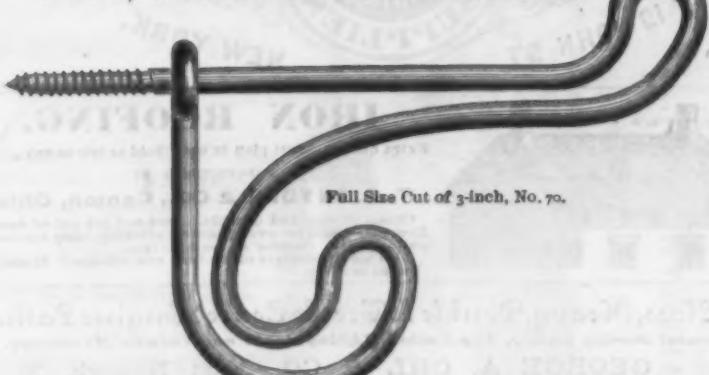
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